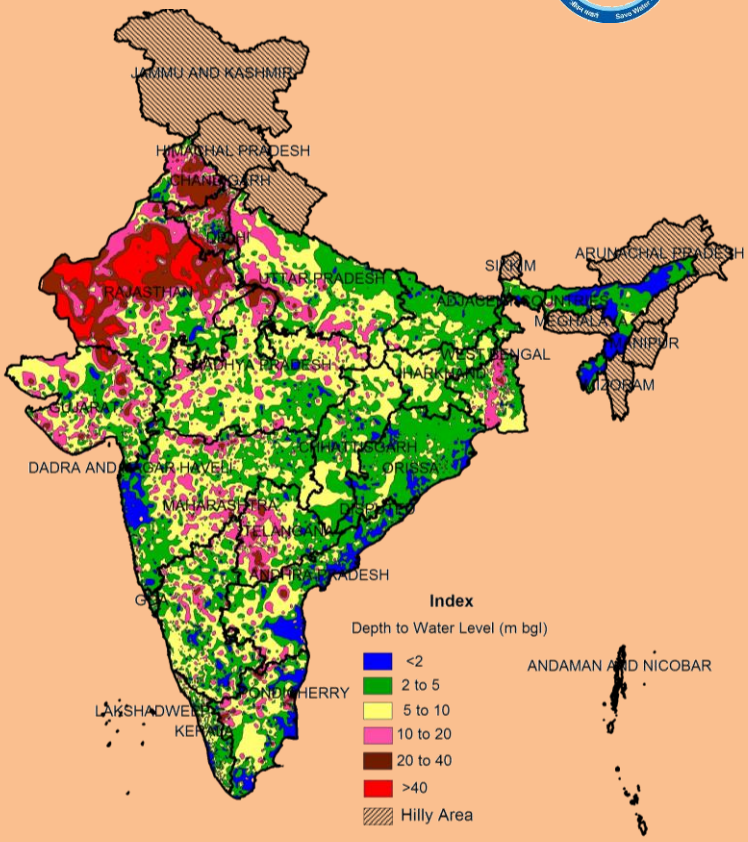
GROUND WATER SCENARIO IN INDIA

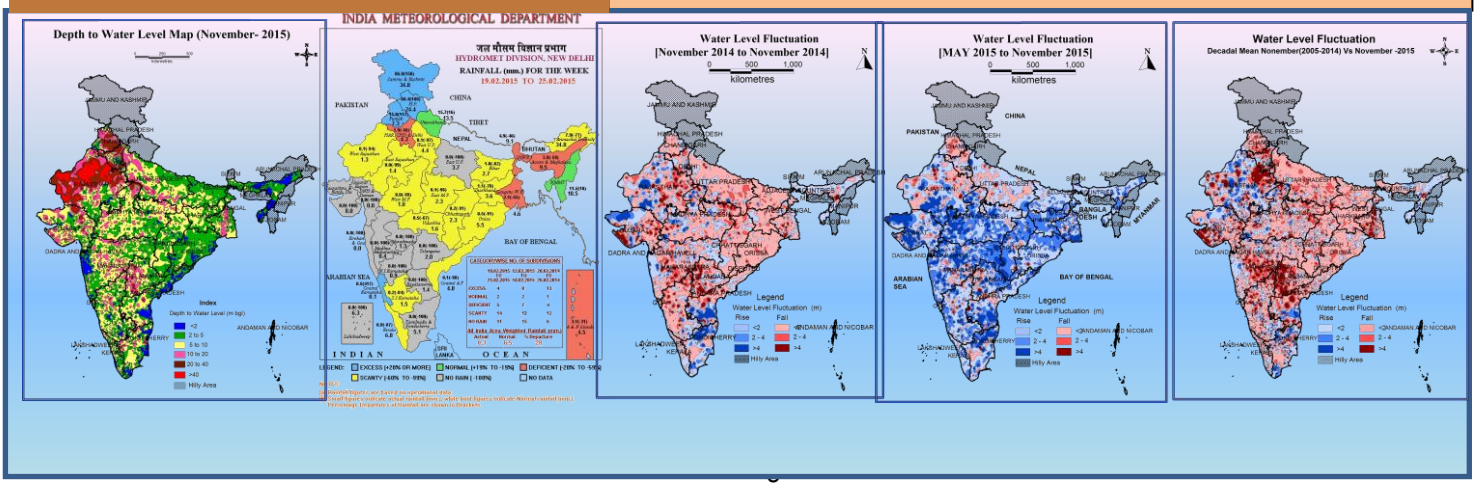
PREMONSOON, 2016

CENTRAL GROUND WATER BOARD

MINISTRY OF WATER RESOURCES

GOVT OF INDIA





GROUND WATER LEVEL SCENARIO IN INDIA
(PREMONSOON - 2016)

1.0 Introduction

Ground water regime monitoring is one of the key activities of CGWB to generate information on ground water level/ quality through representative sampling. The primary objective of establishing the ground water monitoring network stations is to record the response of ground water regime to the natural and anthropogenic stresses of recharge and discharge parameters with reference to geology, climate, physiography, land use pattern and hydrologic characteristics.

Ground water levels are being monitored throughout the Country four times in a year by Central Ground Water Board through a network of **22339** monitoring wells during the months of Premonsoon, Premonsoon (March/April/ May), August and Premonsoon.

The ground water regime monitoring was started in the year 1969 by Central Ground Water Board. At present CGWB has a network of 22339 ground water observation wells, out of which 16190 observation wells are dugwells and 6149 are piezometers. The water level / piezometric head data collected from these observations were entered into the National database and are analysed for obtaining background information of ground water regime and changes on regional scale. The Groundwater level data has been collected from all the states except for Mizoram & Sikkim and UT of Lakshadweep where water level monitoring is not being carried out.

Water level data of Premonsoon 2016 has been analysed to illustrate spatial distribution of water level and its categorization under different ranges. The Premonsoon data has been compared with the previous year Premonsoon data (annual fluctuation), with Premonsoon data (Seasonal Fluctuation) and mean of last 10 years Premonsoon monitoring data (decadal fluctuation); the analytical results are represented through tables and maps along with suitable explanations. Database thus generated forms the basis for planning the ground water development and management programme. This data is also used for assessment of ground water resources and establishing changes in the regime consequent to various development and management activities.

2.0 Rainfall Pattern

Water level / Piezometric heads are resultant of all input/ output from the aquifer. Apart from draft of ground water for various purposes, quantum of rainfall and its component being recharged to the ground water is major controlling factor of the depth to water levels and it’s annual, seasonal or decadal fluctuations. Thus, study of rainfall pattern is very important for understanding spatial and temporal variations in water levels. As per the Climatic bulletins of IMD for monsoon period of 2015, the rainfall pattern has been studied and discussed below.

For the country as a whole, cumulative rainfall during the year's monsoon has been 12% below the Long Period Average (LPA).

Regions	Actual Rainfall (mm)	Normal Rainfall (mm)	% Departure from LPA
Country as a whole	777.5	886.9	-12%
Northwest India	483.1	615.0	-21%
Central India	879.7	974.2	-10%
South Peninsula	665.4	715.7	-7%
East & northeast India	1267.7	1437.8	-12%

Out of 36 meteorological subdivisions, the rainfall has been excess over 1, normal over 23, deficient over 12 sub-divisions and no sub-division under scanty rainfall. Haryana, Chandigarh & Delhi, Punjab and West Uttar Pradesh received deficient rainfall by more the 50% of LPA. In area-wise distribution, 3% area of the country received excess, 67% normal and remaining 30% area received deficient rainfall.

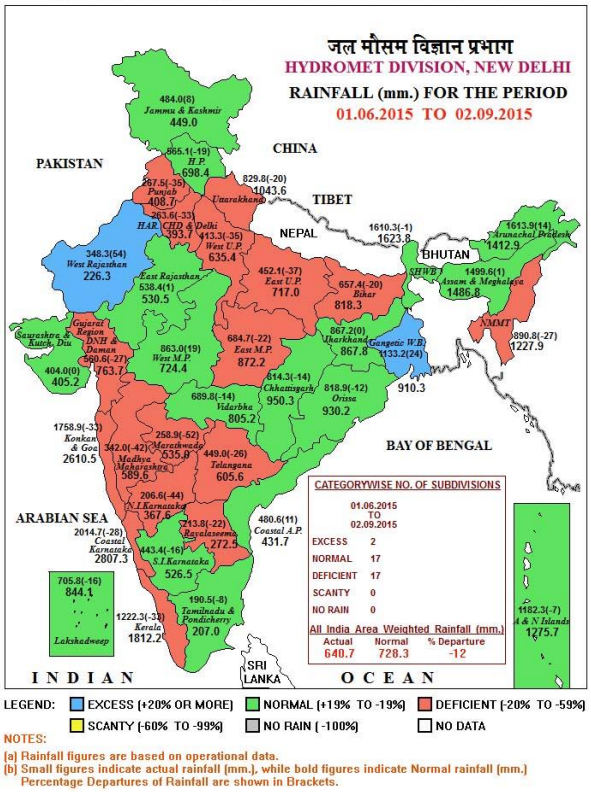
Main Features of Southwest Monsoon, 2015

- Southwest monsoon set in over Kerala on June 2015, as against forecast date of 5 June ± 4 days

- Observed rainfall for the country as a whole during the month of July & Premonsoon was 90% & 91% of the LPA against the forecast of 93%± 9% & 96%±9% of LPA respectively

- The seasonal rainfall for the country as a whole has been 88% of the LPA as against updated Long Range Forecast of 87%± 4% of LPA.

भारत मौसम विज्ञान विभाग
INDIA METEOROLOGICAL DEPARTMENT



LEGEND: EXCESS (+20% OR MORE) NORMAL (+19% TO -19%) DEFICIENT (-20% TO -59%)
SCANTY (-60% TO -99%) NO RAIN (-100%) NO DATA

NOTES:
(a) Rainfall figures are based on operational data.
(b) Small figures indicate actual rainfall (mm.), while bold figures indicate Normal rainfall (mm.)
Percentage Departures of Rainfall are shown in Brackets.

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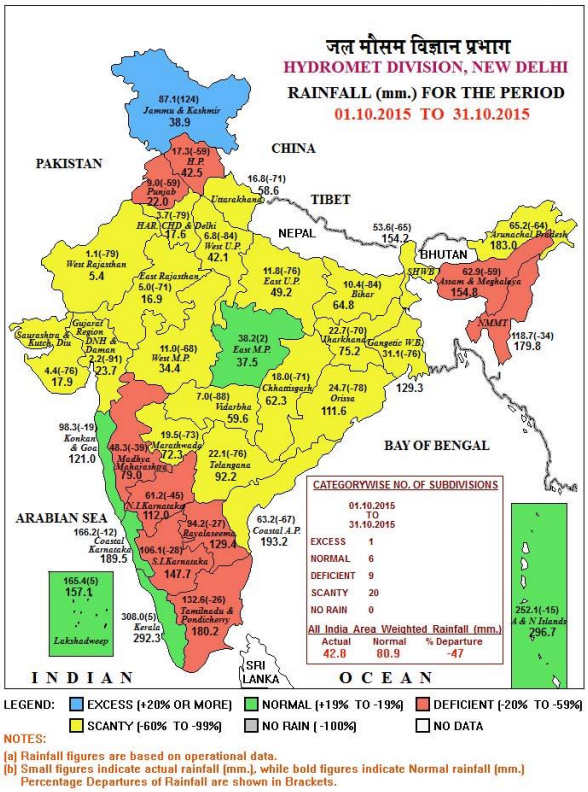

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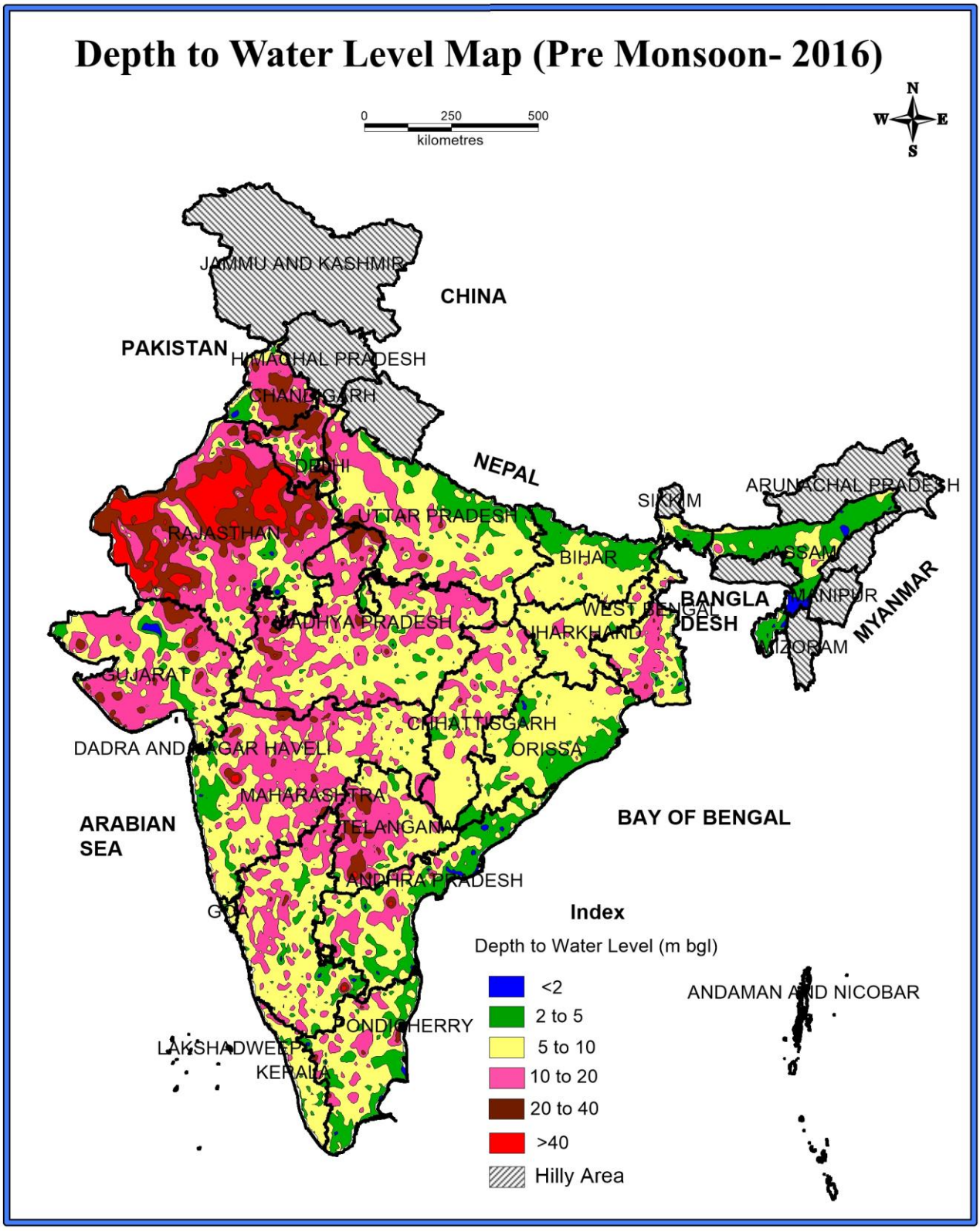
Source: www.imd.gov.in

Plate-II



Source: National Data Centre, CGWB, Faridabad

3.0 Ground Water Level Scenario in India

3.1 Ground Water Level Scenario - Premonsoon 2016

The ground water level data for Premonsoon 2016 indicate that out of the total 14770 wells analysed, 657 (4 %) wells are showing water level less than 2 m bgl (metres below ground level), 3476 (24%) wells are showing water level in the depth range of 2-5 m bgl, 6159 (42 %) wells are showing water level in the depth range of 5-10 m bgl, 3515 (24%) wells are showing water level in the depth range of 10-20 m bgl, 736(5%) wells are showing water level in the depth range of 20-40 m bgl and the remaining 227 (1%) wells are showing water level more than 40 m bgl. The distribution of number of wells under different depth ranges is presented in the histogram (**Fig-1**) and statistical distribution is given in **Annexure-I**. The maximum depth to water level of 153.0 m bgl is observed in Ahmednagar district of Maharashtra whereas the minimum is less than 1 m bgl.

The depth to water level map of Premonsoon 2016 (**Plate II**) for the country indicates that the general depth to water level of the country ranges from 2 to 20 m bgl. To be more specific, in major parts of the country, water level is observed to be in the range of 5 to 10 m. Very shallow water level of less than 2 m bgl is also observed locally, in isolated pockets, in few states, such as Assam, Andhra Pradesh, Himachal Pradesh and Gujarat. In major parts of north-western and western states, depth to water level is generally deeper and ranges from about 10- 40 m bgl. In parts Delhi and Rajasthan, water level of more than 40 m bgl is also recorded. The peninsular part of country recorded a water level in the range of 10 to 20 m bgl. The maximum depth to water level of 153.00 m bgl is observed in Ahmednagar district, Maharashtra whereas the minimum is less than 1 m bgl, seen in various states.

Fig 1

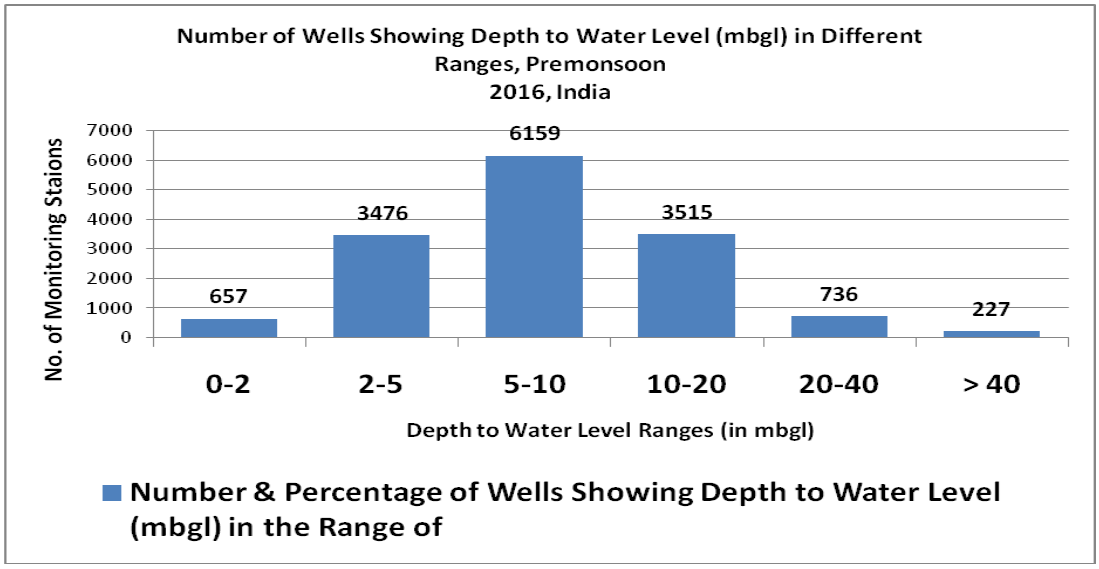
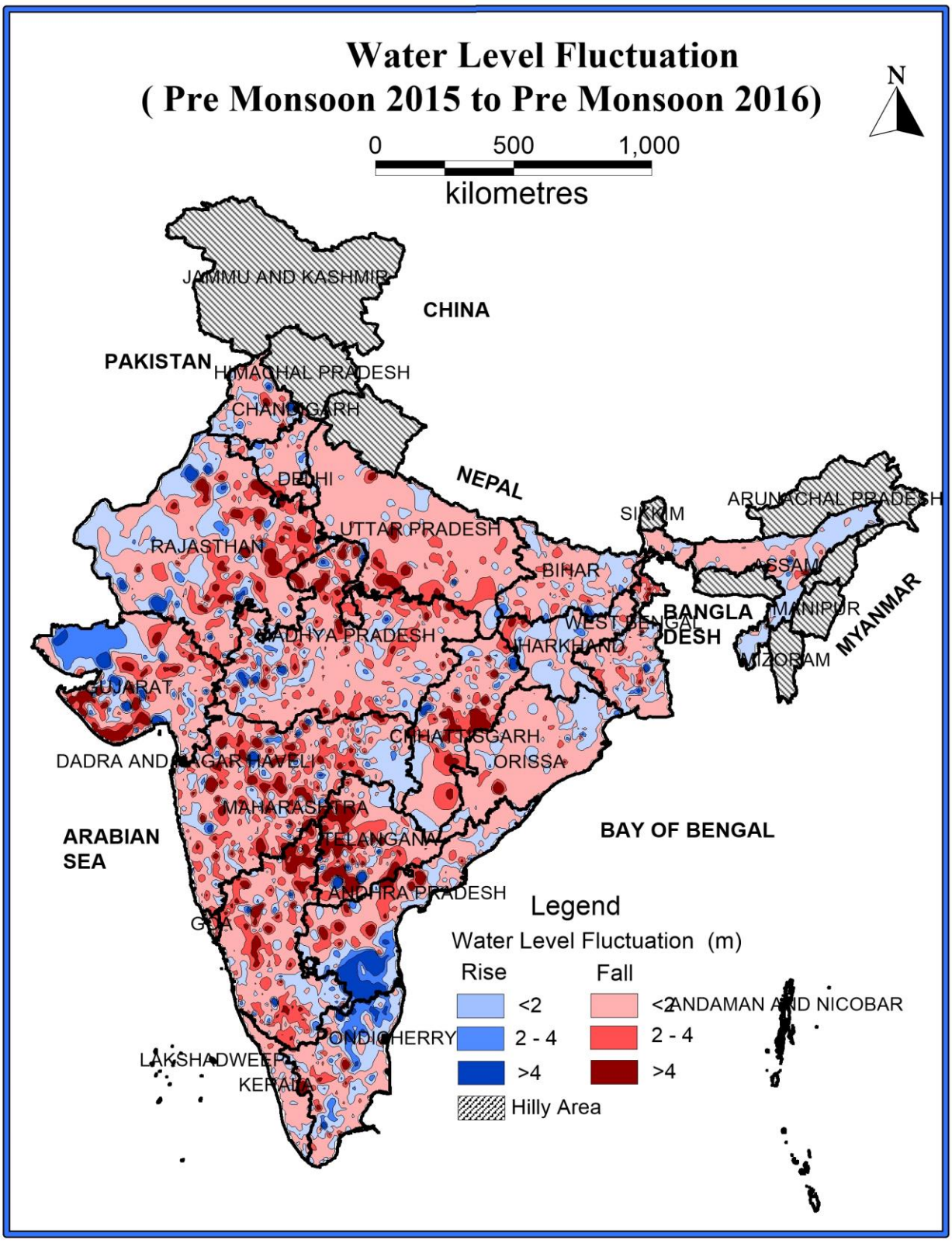


Plate III



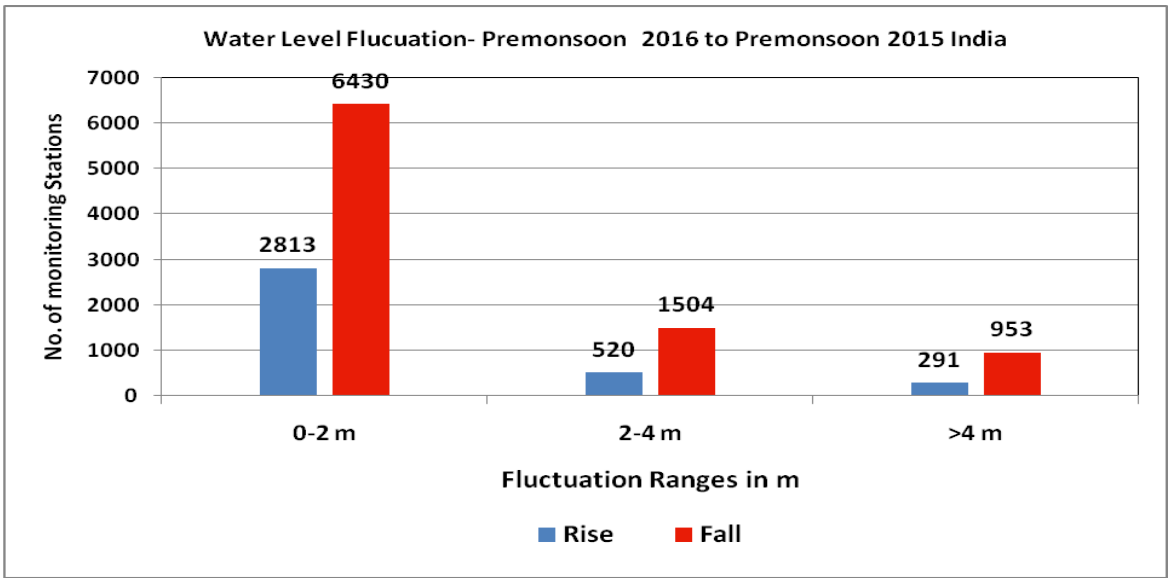
Source: National Data Centre, CGWB, Faridabad

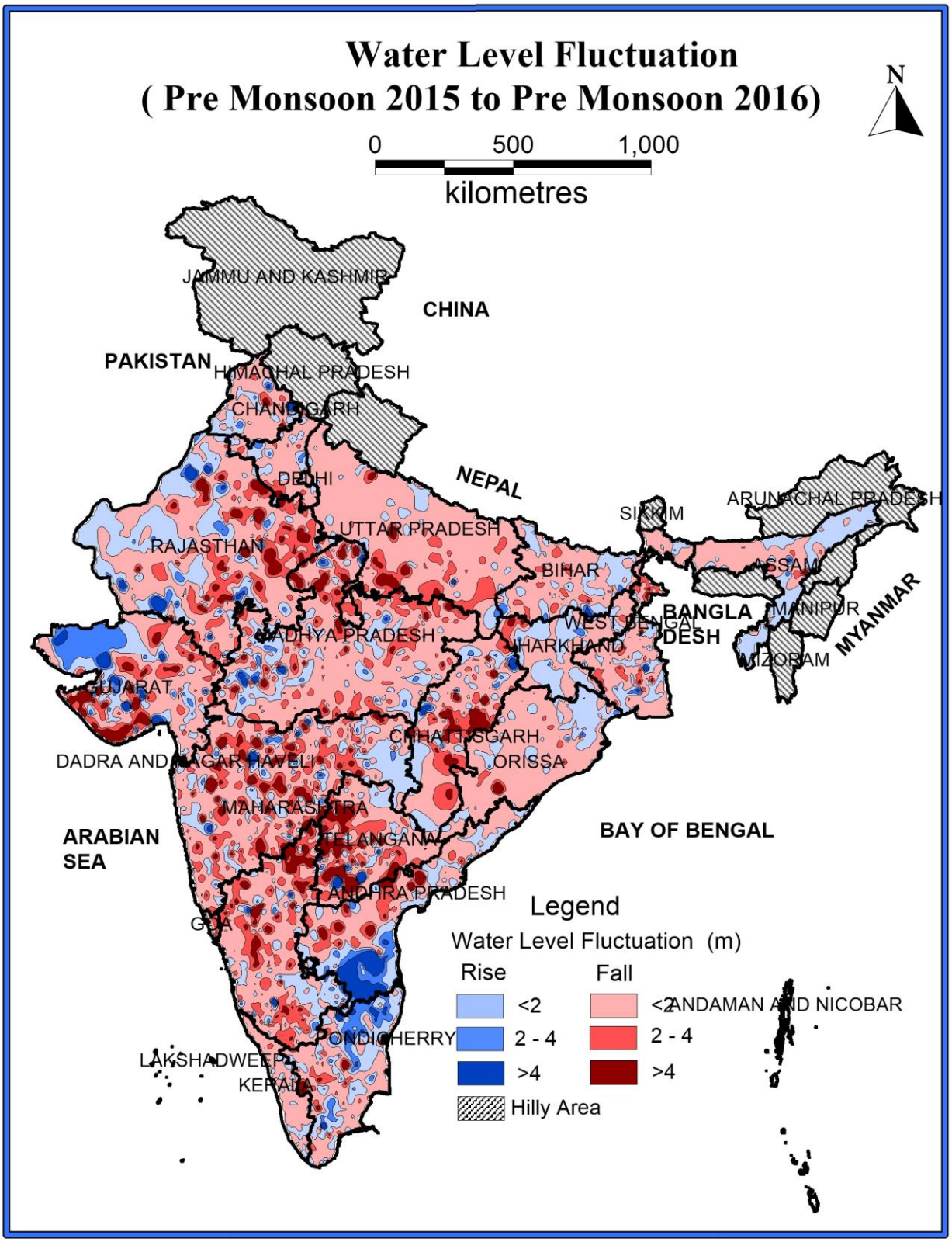
3.2 Water Level Fluctuation (Premonsoon 2016 to Premonsoon 2015)

The water level fluctuation of **Premonsoon 2016 to Premonsoon 2015** shows that out of 12893 wells analysed, 3624 (28%) are showing rise and 8887 (69%) are showing fall in water level. Remaining 382 (3%) stations analysed do not show any change in water level. About 22% wells are showing rise in the water level in the range of less than 2 m. About 4% wells are showing rise in water level in 2-4 m range and 2% wells showing rise in water level more than 4 m range. About 69% wells are showing decline in water level, out of which 50% wells are showing decline in water level in less than 2 m range. About 12% wells are showing decline in water level in 2-4 m range and 7% wells are showing decline in water level more than 4 m range (**Fig-2** and **Annexure-II**). Majority of the wells showing rise/decline falls in the range of 0-2 m.

A comparison of depth to water level of Premonsoon 2016 to Premonsoon 2015 is presented in the form of water level fluctuation map (**Plate III**) reveals that in general, there is fall in water level in almost the entire country. Rise in water level in isolated pockets is observed in the states of Assam, Andhra Pradesh, Gujarat, Tamil Nadu, Rajasthan and Maharashtra. Fall is mostly in the range of 0-2 m, although fall in the range of more than 2 m is also prevalent in all the states in small patches. Fall of more than 4 m is prominent in the states of Chhatishgarh, Gujarat, Karnataka, Madhya Pradesh, Maharashtra and Telangana.

Fig 2





Source: National Data Centre, CGWB, Faridabad

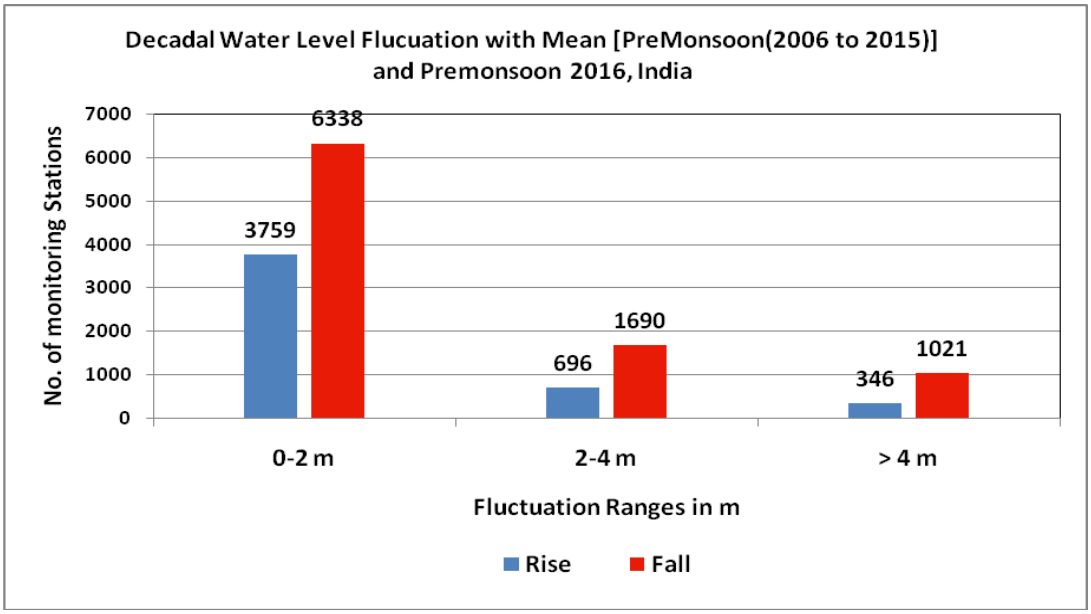
3.3 Water Level Fluctuation (Premonsoon–2016 with Mean of Premonsoon (2006 - 2015)

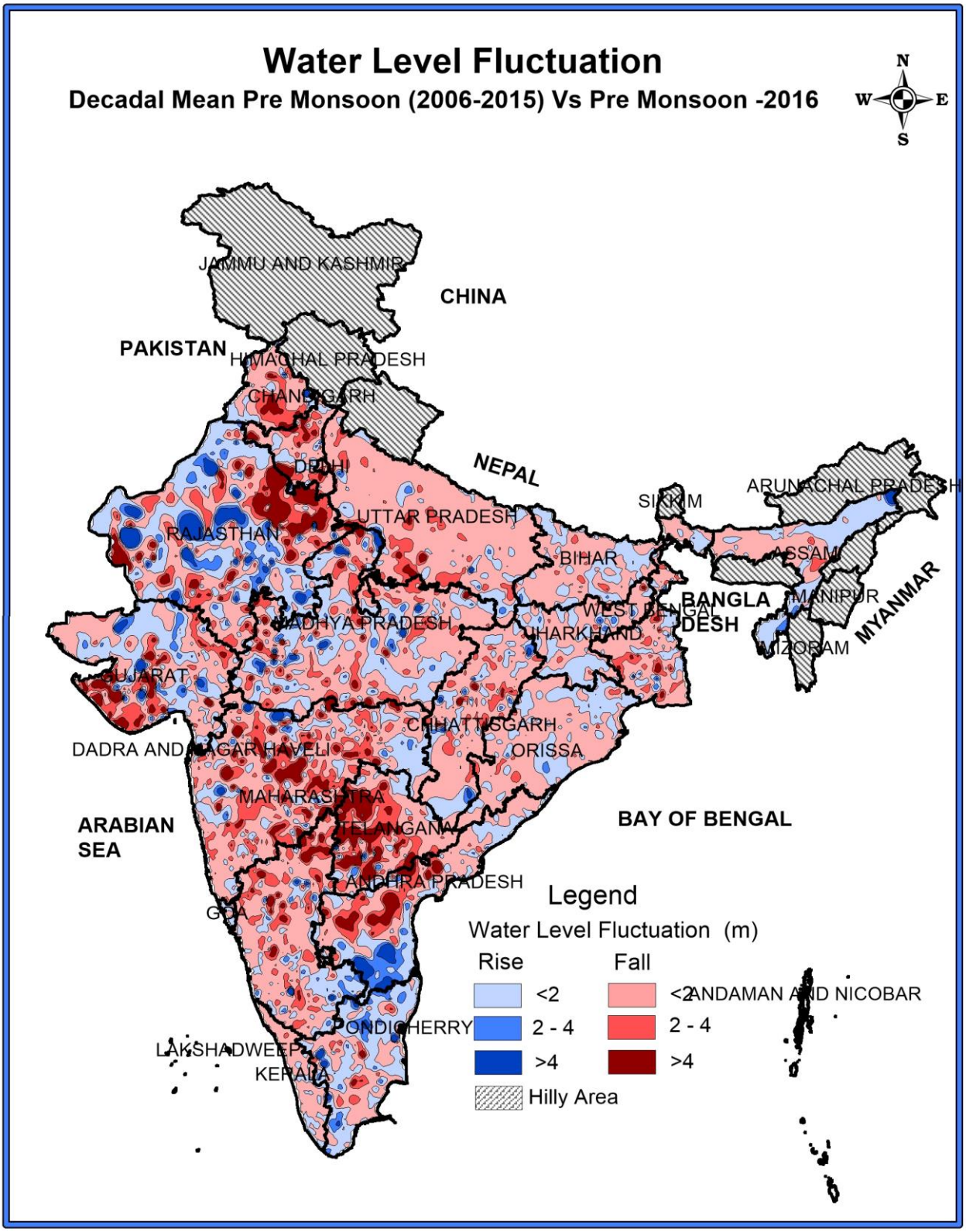
A comparison of depth to water level of Premonsoon 2016 with decadal mean of Premonsoon (2006-2015) indicates that 4801 (about 35%) of wells are showing rise in water level, out of which 27% wells are showing rise of less than 2 m (**Annexure-IV**). About 5% wells are showing rise in water level in the range of 2-4 m and only 2% wells are showing rise in the range of more than 4 m. 9049 (about 65%) wells are showing decline in water level, out of which 46% wells are showing decline in water in the range of 0-2 m. 12% wells are showing decline in water level in 2-4 m range and remaining 7% are in the range of more than 4 m.

Decline is seen in almost all the states/UTs of the country, except few states namely Arunachal Pradesh, Goa, Pondicherry, Tamil Nadu and Tripura. Decline of more than 4 m has also been observed in pockets in the states/UTs of Andhra Pradesh, Chhattisgarh, Dadra & Nagar Haveli, Delhi, Gujarat, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Punjab, Rajasthan, Telangana and West Bengal. Rise in water level of more than 4 m is also observed in few states in isolated pockets such as Andhra Pradesh, Arunachal Pradesh, Madhya Pradesh, Rajasthan and Tamil Nadu.

The decadal water level fluctuation map of India for Premonsoon, 2016 with the mean of Premonsoon (2006-2015) is shown in **Plate-IV** and frequency distribution of fluctuation ranges is shown in **Fig. 3.** Almost the whole country is showing decline in water level, maximum fall is observed in and around parts of Rajasthan, Haryana, Punjab, Gujarat, Telangana,and Maharashtra, A rise in water level is observed in few states but occurs sporadically.

Fig 3

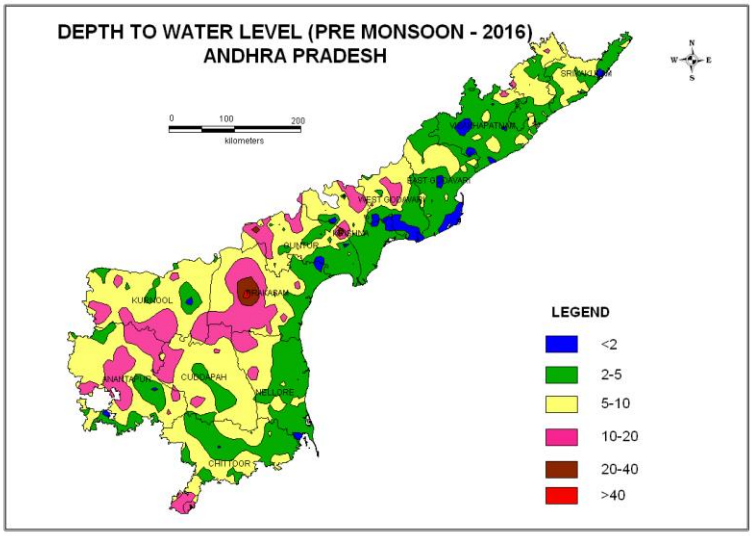



Water Level Fluctuation
Decadal Mean Pre Monsoon (2006-2015) Vs Pre Monsoon -2016
N
W
E
S
JAMMU AND KASHMIR
CHINA
PAKISTAN
HIMACHAL PRADESH
CHANDIGARH
DELHI
NEPAL
SIKKIM
ARUNACHAL PRADESH
UTTAR PRADESH
RAJASTHAN
BIHAR
ASSAM
BANGLA DESH
MANIPUR
WEST BENGAL
MADHYA PRADESH
JHARKHAND
MYANMAR
MIZORAM
GUJARAT
CHHATTISGARH
DADRA AND NAGAR HAVELI
ORISSA
MAHARASHTRA
ARABIAN SEA
BAY OF BENGAL
TELANGANA
ANDHRA PRADESH
GOA
Legend
Water Level Fluctuation (m)
Rise
Fall
<2
<2
2 - 4
2 - 4
>4
>4
Hilly Area
ANDAMAN AND NICOBAR
PONDICHERRY
LAKSHADWEEP
KERALA

4.0 State-wise scenario of ground water level and comparison with previous year water level as well as change with respect to decadal average has been discussed in the following section.

4.01 Andhra Pradesh

Depth to Water Level - Premonsoon 2016



In the state of Andhra Pradesh very shallow water level ranging between 0-5 m bgl was observed in about 53% of the wells monitored. Shallow water level range is observed along the coastal tract of the state. The depth to water level between 5-10 meters has been observed in 34 % wells mainly in the southern, central and western parts of the state. Depth to water level ranging between 10-20 meters has been observed in 12% wells mainly in the southern parts. Water level of more than 20 m bgl has been observed in less than 1% well. The depth to water level in the state ranges upto 49.30 m bgl (in Prakasham district).

Water Level Fluctuation (Premonsoon 2016 to Premonsoon 2015)

Water level data of Premonsoon 2016 was compared to Premonsoon 2015 and the analysis shows that about 49% of the wells analysed are showing fall in water level and 45% wells are showing rise in water level. 6% wells show no change in water level. Out of this 45% rise, 33% wells have shown a rise in 0-2 m range. In the fall category, about 37% of the wells show fall in 0-2 m range. Rise and fall is in the range of 0-2 m.

Fluctuation - Premonsoon 2016 to Premonsoon Decadal mean (2006-15)

The water level data of Premonsoon 2016 has been compared with decadal mean (Premonsoon 2006 2015) to assess the rise/fall in water level during current year with respect to long term average of the corresponding period. About 39 % of analysed wells have shown a rise in water level. Out of this 30% of the wells have shown rise in the range of 0 to 2 m. About 60% wells have shown a fall in water level, out of which 42% wells have shown fall in the range of 0 to 2 m and 11 % wells have shown fall in 2- 4 m and 8% wells shows fall of more than 4 m.

4.02 Arunachal Pradesh

Depth to Water Level - Premonsoon 2016

In general depth to water level scenario in the state depicted water level in the range of 2 to10 m bgl at about more than 73 % of the wells monitored.

Water Level Fluctuation - Premonsoon 2016 to Premonsoon 2015

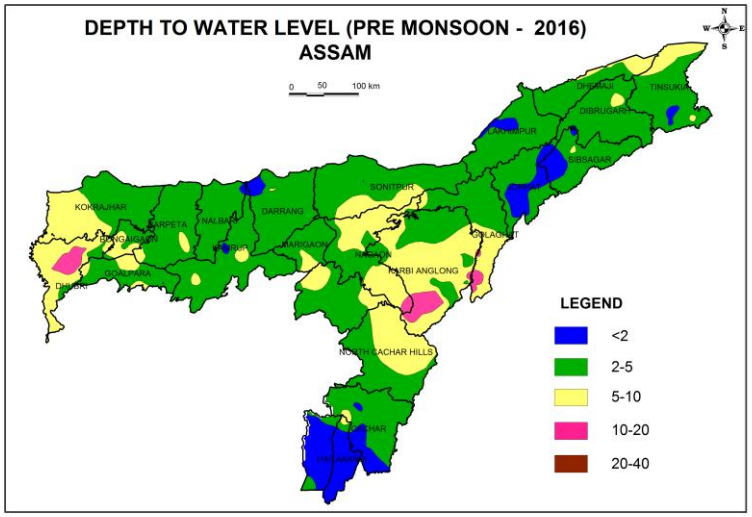
Water level of Premonsoon 2016 when compared to that of Premonsoon 2015 shows that there is rise in water level in the state. About 46 % of the wells analysed show a rise in water level. 31% wells show decline in water level and all the wells lies in 0-2 m range.

Fluctuation - Premonsoon 2016 to Premonsoon Decadal mean (2006-15)

The water level data of Premonsoon 2016 has been compared with decadal mean (Premonsoon 2006-2015) and it is observed that 71% of the wells analysed show rise in water level whereas only 29% shows fall in water level. Both rise and decline are in the range of 0-2 m but 7 % wells show rise in more than 4m range also.

4.03 Assam

Depth to Water Level-Premonsoon 2016



In general depth to water level scenario in the state depicted a water level in the range of 2 to 10 m bgl at almost 84 % of the wells monitored. 59 % wells recorded water level between 2-5 m bgl and 24% wells show water level between 5-10 m bgl.

A shallow water level within 2 m bgl is recorded in 14% wells monitored in few districts. The maximum depth to water level has been recorded as 19.67 m bgl in Dhubri district.

Water Level Fluctuation - Premonsoon 2016 to Premonsoon 2015

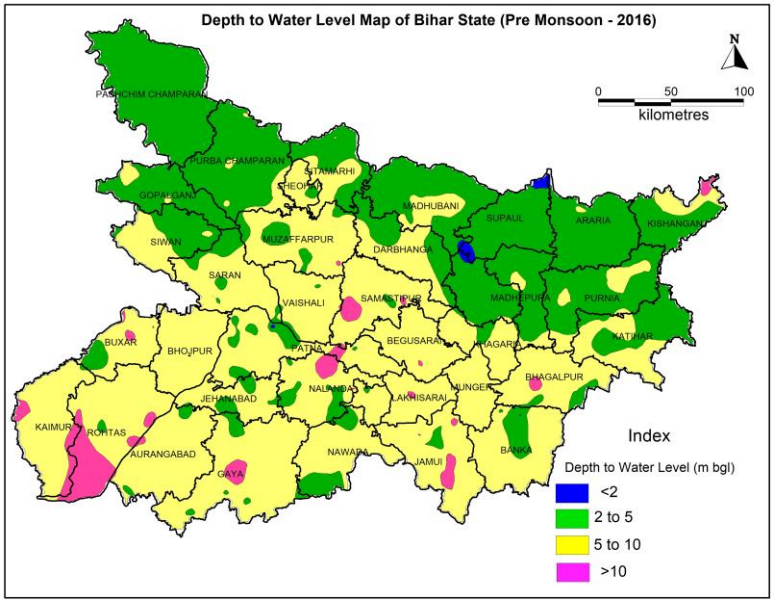
Water level of Premonsoon 2016 when compared to that of Premonsoon 2015 shows that there is rise in water level in about 48 % of the wells analysed. Out of this, 42% of the wells showing rise in water level in less than 2 m range. A rise of 2-4 m is observed in 3 % of the wells analyzed. About 52 % of wells analysed have shown fall in water level where 44 % of the wells shows fall in the range of 0-2 m.

Fluctuation - Premonsoon 2016 to Premonsoon Decadal mean (2006-15)

The water level data of Premonsoon 2016 has been compared with decadal mean (Premonsoon 2006-2015) and it is observed that out of 182 wells analyzed 46 % show a rise in water level whereas 54% show a fall in water level. 40% wells show rise in the range of 0-2 m and 47% wells show fall in the range of 0-2 m. Rise and fall is in 0-2 m range.

4.04 Bihar

Depth to Water Level – Premonsoon 2016



During Premonsoon 2016 water level measurement, a total of 623 wells hav been monitored. Only 1 % of the well shows water level in the range 0-2 m bgl in small isolated patches. 37 % of the wells are showing water level in the range 2-5 m bgl, especially in the whole of northern part of the state. 57 % of the wells analysed are showing water level in the range of 5-10 m bgl. In major parts of the state water level falls within 5-10 m bgl. 5% of the wells are showing water level in the range 10-20 m bgl. The maximum depth to water level has been recorded as 15.80 m bgl in Jamui district.

Water Level Fluctuation - Premonsoon 2016 to Premonsoon 2015

Water level data of Premonsoon 2016 was compared to Premonsoon 2015 and the analysis shows that in general there is fall in water level in the state. About 82 % of the wells analysed are showing fall in the water level. Out of this, 63 % wells have shown a fall in 0-2 m range. 17% wells shows fall in water level in the range of 2-4 m. Only 17% wells show rise in water level , out of which about 16% of the wells analysed are showing rise in the water level mostly in the range of 0 -2 m.

Fluctuation - Premonsoon 2016 to Premonsoon Decadal mean (2006-15)

The water level data of Premonsoon 2016 has been compared with decadal mean (Premonsoon 2006 to 2014) and it indicates that out of 551 wells analyzed, only 33 wells show a rise in water level whereas rest 67% show a fall in water level. Out of 33% rise, 30% wells fall in 0-2 m range, whereas, out of 67% fall, 57% wells show fall in 0-2 m range.

4.05 Chandigarh

Depth to Water Level – Premonsoon 2016

In general depth to water level scenario in the UT of Chandigarh depicted around 17% monitoring stations recorded water level between 2-5 m bgl. Another 33 % wells recorded water level between 5-10 m bgl, 25% wells show water level between 10-20 m bgl and 25% in 20-40 m bgl. The maximum depth to water level has been recorded as 28.75 m bgl.

Water Level Fluctuation – Premonsoon 2016 to Premonsoon 2015

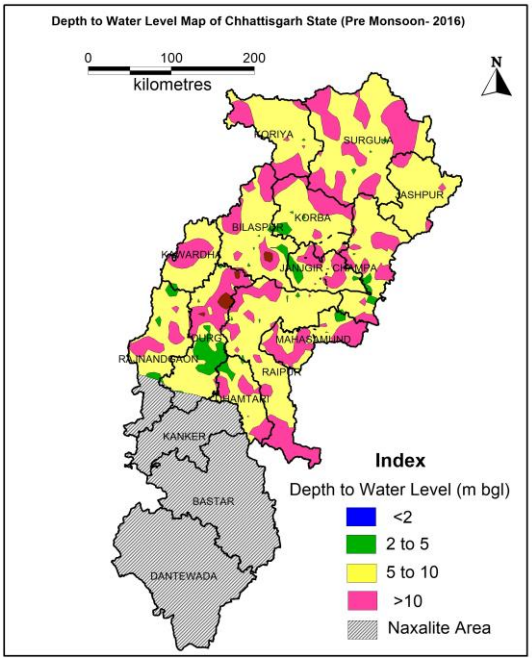
Water level of Premonsoon 2016 when compared to that of Premonsoon 2015 shows that there is predominantly rise in water level in the state. About 60% of the wells analysed show a rise in water

level. Out of this, 50% of the wells showing rise in water level in less than 2 m range and 10% wells show rise in 2-4 m range. About 40% of wells analysed have shown decline in water level, out of which 20% wells show fall in 0-2 m range and another 20% in 2-4 m range.

Fluctuation - Premonsoon 2016 to Premonsoon Decadal mean (2006-15)

The water level data of Premonsoon 2016 has been compared with decadal mean (Premonsoon 2006-2015) and it shows that there is predominantly fall in water level in the UT. Only 36 % of the wells analysed show rise in water level and 64% shows decline in water level. Out of 64% in the fall category, 55% wells fall in the 0-2 m range and 9% each in 2-4 range.

4.06 Chhattisgarh



Depth to Water Level – Premonsoon 2016

During Premonsoon 2016 water level measurement, a total of 623 monitoring wells has been analysed. More than 80% of the wells analysed fall in the range of 5-20 m bgl. Only 1% of the wells analysed show water level in the range of 0-2 m bgl, 15% wells show water level in 2-5 m bgl and about 54 % wells fall under the category of 5-10 m bgl. About 26% wells show water levels in the range of 10-20 m bgl. The maximum water level measured is 54.80 m bgl in Bilaspur District.

Water Level Fluctuation - Premonsoon 2016 to Premonsoon 2015

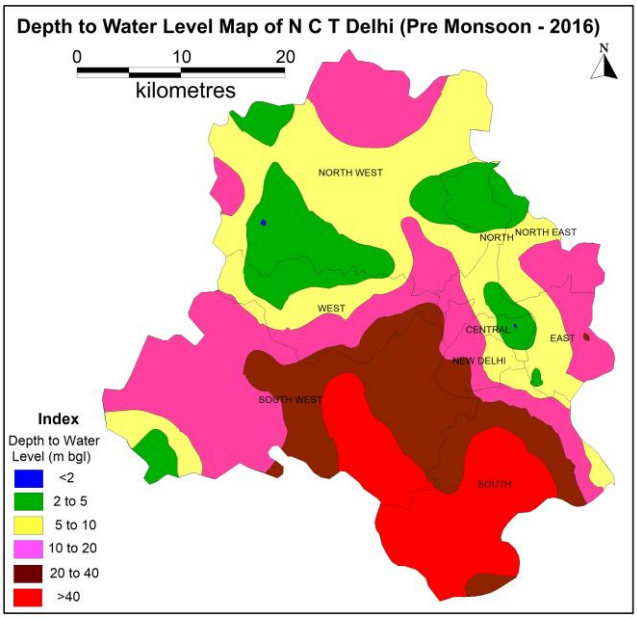
Water level data of Premonsoon 2016 was compared to Premonsoon 2015 and the analysis shows that in general there is fall in water level in the state. About 79 % of the wells analysed are showing fall in water level. Out of this, 50 % wells have shown a decline in 0-2 m range and 16% wells show decline 2- 4 m range. 20% wells shows rise in water level, out of which about 13 % of the wells analysed are showing rise in the water level mostly in the range of 0-2 m.

Fluctuation - Premonsoon 2016 to Premonsoon Decadal mean (2006-15)

When compared the decadal mean water level (Premonsoon 2006 to 2015) with Premonsoon 2016, it has been observed that entire state shows decline in water level. Only about 27% of observation wells are showing a rise in water level, out of which 18% wells are showing rise in less than 2 m range. Fall in water level as compared to the decadal mean is observed in 73% of the analysed wells. Almost 51% of the analysed wells are showing fall in the range of 0-2 m, 16 % in 2-4 m range and 7% wells show fall in more than 4 m range.

4.07 Delhi

Depth to Water Level – Premonsoon 2016



The depth to water level recorded in the state of Delhi during Premonsoon 2016 ranges from 1.84 m bgl to 58.89 m bgl (South District). It is observed that only 2% of the wells have shown water level in the range of 0-2 m bgl. About 21 % of the wells analysed have shown water level in the range of 2-5 m bgl, about 26% of the wells have shown water level in the range of 5-10 m bgl and 27 % wells show water level in the range of 10-20 m bgl. Deeper water level in the range of 20-40 m bgl and more than 40 m bgl are shown by 16% & 9% of the wells analysed respectively. It is observed that Southern parts of Delhi show deeper water levels of more than 20 m bgl.

Water Level Fluctuation - Premonsoon 2016 to Premonsoon 2015

Water level of Premonsoon 2016 when compared to water level of Premonsoon 2015 in the state indicates there is fall in water level in the entire state. About 28 % of the wells analysed have recorded a rise in water level, out of which 24 % of analysed wells have recorded a rise in the range of 0 to 2 m. About 72% of the wells have shown decline in water level, out of which 64% fall in the range of 0 to 2 m.

Fluctuation - Premonsoon 2016 to Premonsoon Decadal mean (2006-15)

The fluctuation analyses of water level during Premonsoon 2016 when compared with the Decadal mean (Premonsoon 2006-2015) indicates that in general there is fall in water level in the state. 77 % of analysed wells have shown decline in water level. Out of this, 45 % of the wells have shown fall in the range of 0-2 m. About 17% wells have shown a decline in 2-4 m and 16% wells show decline of more than 4 m. 23% wells show rise in water level, out of which 17% show rise in 2-4 m range.

4.08 Goa

Depth to Water Level - Premonsoon 2016

The depth to water level recorded in the state of Goa during Premonsoon 2016 ranges from 2.08 m bgl to 18.84 m bgl in North Goa. It is observed that out of 71 monitored wells, none of the wells show less than 2 m bgl water level, 41% wells show 2 to 5 m bgl water level, 48% wells show 5 to 10 m bgl water level and 11% wells show 10 to 20 m bgl water level.

Water Level Fluctuation – Premonsoon 2016 to Premonsoon 2015

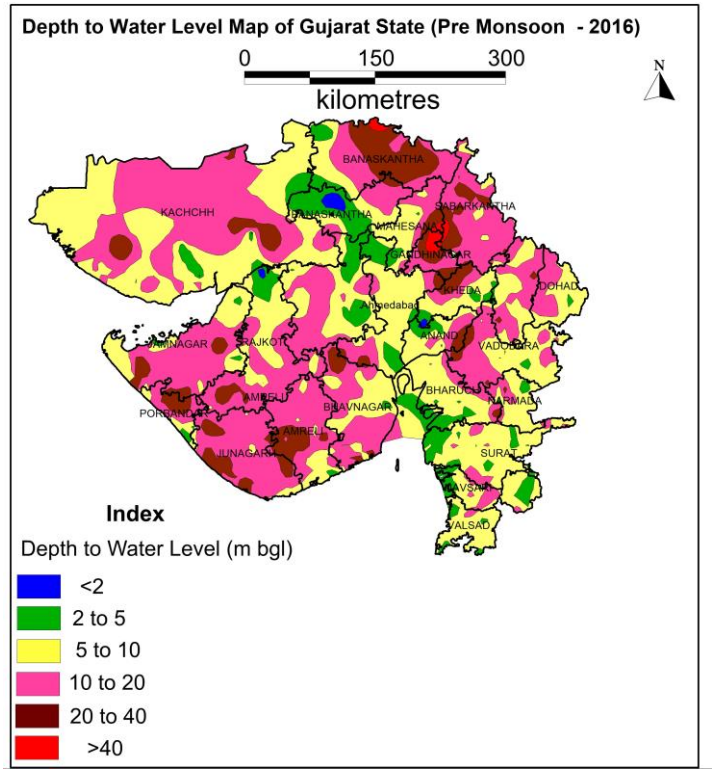
Water level of Premonsoon 2016 when compared to water level of Premonsoon 2015 in the state indicates both rise and fall in water level in the state. About 43 % of the wells analysed have recorded a rise in water level and the analysed wells have recorded a rise in the range of 0 to 2 m. 57% wells shows fall in water level and mostly in the range of 0-2 m.

Fluctuation - Premonsoon 2016 to Premonsoon Decadal mean (2006-15)

The fluctuation of water level during Premonsoon 2016 when compared with the Decadal mean (Premonsoon 2006-2015) indicates both rise and fall in water level in the state. About 59% of analysed wells have shown a rise in water level. Out of this 52% of the wells have shown rise in the range of 0 to 2 m. About 41 % wells have shown a fall in water level and all the wells fall in the range of 0-2 m.

4.09 Gujarat

Depth to Water Level - Premonsoon 2016



The depth to water level recorded in the state of Gujarat during Premonsoon 2016 ranges up to 58.24 m bgl in Gandhinagar district. In general, depth to water level ranges between 5-20m bgl. The depth to water level for 3% of the wells analysed have shown water level in the range of 0-2 m bgl, 15 % of the wells have shown water level in the range of 2-5 m bgl. About 34% of the wells analysed have shown water level in the range of 5-10 m bgl and 37 % of the wells have shown water level in the range of 10-20 m bgl. Deeper water level in the range of 20-40 m bgl and more than 40 m bgl are shown by about 11% of the wells analysed.

Water Level Fluctuation - Premonsoon 2016 to Premonsoon 2015

Water level data of Premonsoon 2016 when compared to Premonsoon 2015 shows that in general there is fall in water level in the state. About 35 % of the wells analysed shows rise in the water level. Out of this, 24% wells have shown a rise in the range of 0-2 m. About 6% of the wells have shown rise in 2- 4 m range and about 4% wells have shown rise in water in more than 4 m. About 55% of the total wells have shown a fall in water level, out of which 33% wells have shown a fall in 0-2 m range. 11% wells show fall in 2-4 m range and another 11% wells in more than 4 m range. 10% of the wells show no change in water level.

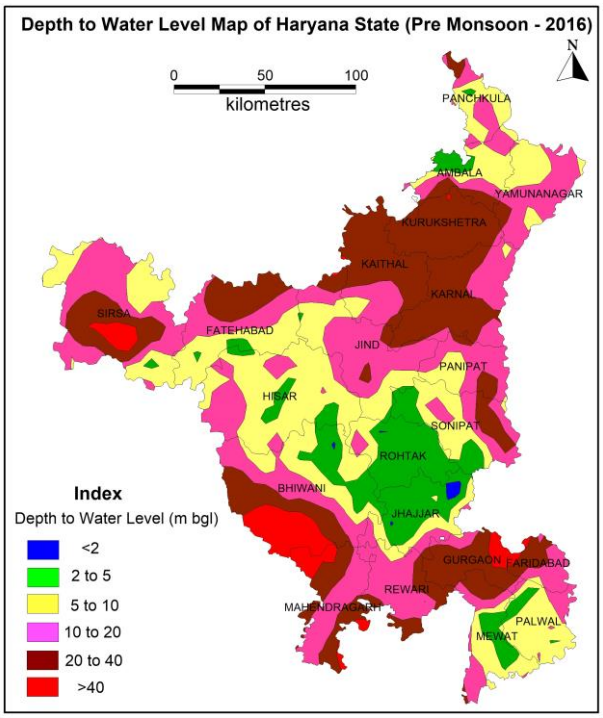
Fluctuation - Premonsoon 2016 to Premonsoon Decadal mean (2006-15)

The water level data of Premonsoon 2016 has been compared with decadal mean (Premonsoon 2006 to 2015) to assess the rise/fall in water level of this year with respect to long term average of the corresponding period. 34% of monitoring wells shows rise in water level and 64 % wells are showing fall in water level. About 23% of wells show rise in 0-2 m range, 9% wells shows rise in the 2-4 m range and 3% wells are showing rise in the range of more than 4 m. 39 % of the wells have shown fall in water level in the range of 0-2 m. Another 13% wells show fall in 2-4 m range and almost 13% wells show fall in more than 4 m range.

4.10 Haryana

Depth to Water Level - Premonsoon 2016

During Premonsoon 2016, the depth to water level in the state of Haryana varies from 0.51 to 76.04 m bgl in Bhiwani district. In Haryana, water level generally varies in the range of 10 - 20 m bgl in which maximum wells falls. About 4% of wells monitored have reported water level up to 2 m bgl. About 21% of the wells monitored falls within the range of 2-5 m bgl. Another 26% of the wells monitored falls within the range of 5-10 m bgl. Moderately deep water level i.e. 10-20 m bgl occurs in major parts of the State, observed in almost 30% of the monitored wells. Deep water level i.e. 20-40 m bgl is observed in 17% of the monitored wells. Very deep water levels more than 40 m bgl are also observed in almost 3% of the monitored wells.



Water Level Fluctuation - Premonsoon 2016 to Premonsoon 2015

The water level data of Premonsoon 2016 when compared with Premonsoon 2015 indicates that there is rise in water level in about 34 % of the wells monitored, out of which 28% of the wells monitored show rise in the range between 0-2 m. Decline in water level has been recorded in 66 % of the wells, mostly in 0-2 m range, in 55% of wells. Rise and fall is mainly restricted to 0-2 m range.

Fluctuation - Premonsoon 2016 to Premonsoon Decadal mean (2006-15)

The fluctuation of water level during Premonsoon 2016 when compared with the average water level of past decade (Decadal mean Premonsoon 2006-2015) indicates in general there is decline in water level in the entire state. About 37% of monitored wells have shown rise in water level. The

rise of 0-2 m has been observed in about 32% of the wells analysed. About 63% of wells analysed have shown fall in water level. Fall in the range of 0-2 m has been recorded in 39% of monitored wells, 15 % wells in 2-4 m range and 10% wells in more than 4 m range.

4.11 Himachal Pradesh

Depth to Water Level - Premonsoon 2016

The depth to water level in the state of Himachal Pradesh during Premonsoon 2016 varies from 0.36 m bgl to 28.23 m bgl in Sirmaur district. About 45% of the wells show water level of less than 5 m bgl. Out of these almost 5% of the wells are showing water level in the range of 0-2 m bgl, another 40 % of the wells show water level in the range of 2-5 m bgl. About 27% of the wells are showing water level in the range of 5 -10 m bgl while another 20% of the wells are showing water level in the range of 10-20 m bgl. Deep water levels of more than 20 m are observed only at 8% monitoring stations.

Water Level Fluctuation – Premonsoon 2016 to Premonsoon 2015

The water level data of Premonsoon 2016 when compared with Premonsoon 2015 indicates that there is fall in water level in the entire state. Only about 21 % of the wells analysed show rise in water level, out of which 18% of the wells monitored show rise in the range between 0-2 m. Decline in water level has been recorded in 79% of the wells and out of which, 62 % show fall in 0-2 m range and another 15% show fall in 2-4 m range.

Fluctuation - Premonsoon 2016 to Premonsoon Decadal mean (2006-15)

The water level data of Premonsoon 2016 has been compared with decadal mean (Premonsoon 2006 to 2015) to assess the rise/fall in water level of this year with respect to long term average of the corresponding period. About 38% of monitoring wells show rise in water level and rest 62% wells show fall in water level. Out of 38 % wells in the rise category, about 32% of the monitored wells show rise in the 0-2 m range. 62 % of the wells have shown decline in water level, out of which 50% falls in the range of 0-2 m range and 10 % in 2-4 m range.

4.12 Jammu & Kashmir

Depth to Water Level - Premonsoon 2016

It is observed that out of the total 225 wells monitored, water level ranges from 0.49 to 35.47 m bgl. Water level varies from 0-2 m bgl in 13% of the wells. About 53% wells have shown 2-5 m bgl water level, mainly in outer plain areas. About 24% of the wells analysed have shown water level in the range of 5-10 m bgl. About 7% wells have shown water level in the range of 10-20 m bgl. About 4% wells show deeper water level of 20-40 m bgl water level and the remaining 4% wells have more than 40 m bgl water level.

Water Level Fluctuation – Premonsoon 2016 to Premonsoon 2015

The water level data of Premonsoon 2016 when compared with Premonsoon 2015 indicates that there is fall in water level in the entire state. Only about 15% of the wells monitored show rise in water level, out of which 14% of the wells monitored show rise in the range between 0-2 m. Decline in water level has been recorded in 85% of the wells, out of which 57% shows decline in 0-2 m range. Rise and decline of water level in mainly restricted upto 2 m range.

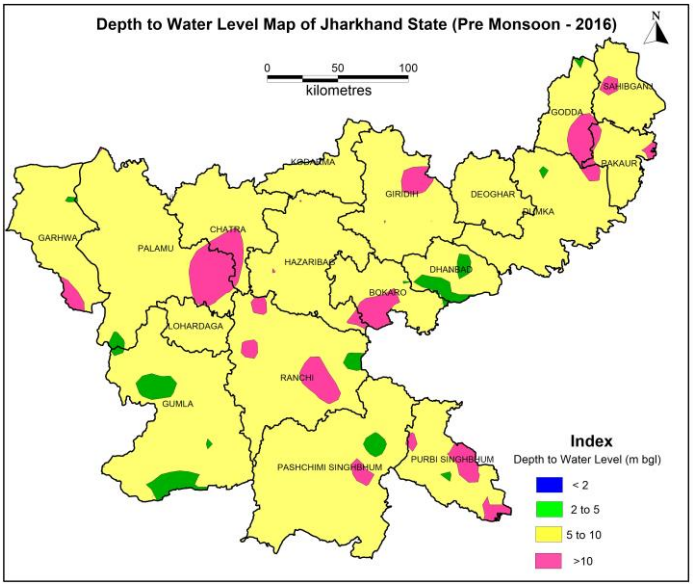
Fluctuation - Premonsoon 2016 to Premonsoon Decadal mean (2006-15)

The fluctuation analyses of water level of Premonsoon 2016 with the decadal mean (Premonsoon 2006- 2015) indicates that there is fall in water level in the state and about 63% of analysed wells have shown a fall in water level. Out of this 54% of the wells have shown fall in the range of 0 to 2 m. About 37% wells have shown a decline in water level, out of which 35% of the wells have shown fall in the range of 0 to 2 m.

4.13 Jharkhand

Depth to Water Level - Premonsoon 2016

During Premonsoon 2016, water level in the state varies in the range of 5-10 m bgl. Out of the total 230 wells analysed, less than 11% of wells have shown depth to water level in the range of 2 to 5 m bgl and majority of the wells, 74% of the wells analysed are showing water level in the range of 5-10 m bgl. Deeper water levels of 10-20 m are observed in about 15% wells.



Water Level Fluctuation - Premonsoon 2016 to Premonsoon 2015

In the state of Jharkhand there is fall in water level in Premonsoon 2016 as compared to Premonsoon 2015. About 70% of the wells analysed shows fall in the water level. Out of this 59% wells have shown a fall in 0-2 m range. Only 29% of the wells analysed show rise in water level, out of which 22% show fall in the range of 0-2 m.

Fluctuation - Premonsoon 2016 to Premonsoon Decadal mean (2006-15)

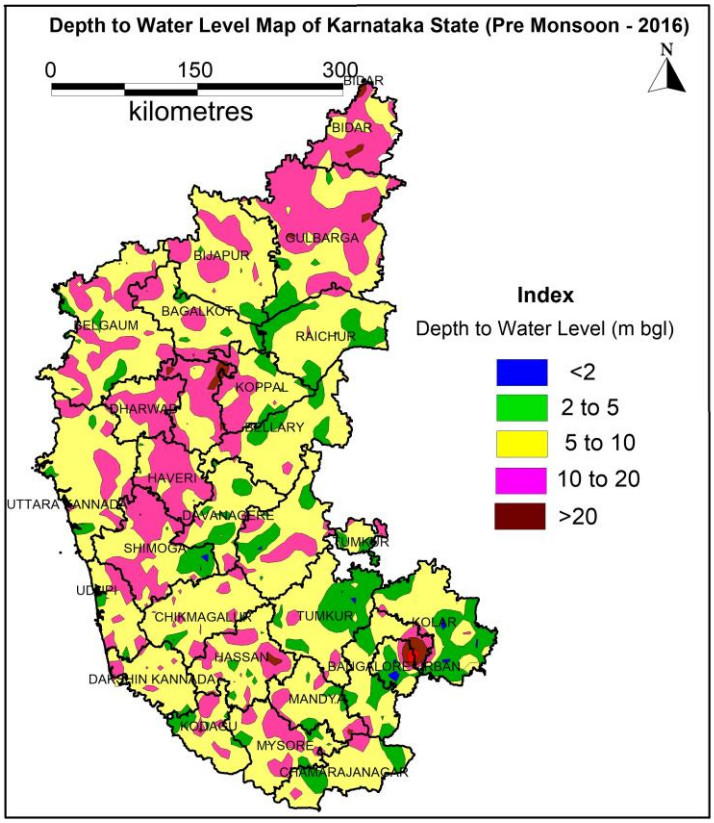
The water level data of Premonsoon 2015 has been compared with decadal mean (Premonsoon 2005- 2016 to assess the rise/fall in water level during current year with respect to long term average of the corresponding period. About 41% of analysed wells have shown a rise in water level. Out of this 33% of the wells have shown rise in the range of 0 to 2 m, 6% wells have shown

rise in the range of 2 to 4 m. About 59% wells have shown a fall in water level, out of which 51% wells have shown fall in the range of 0 to 2 m and 7 % in 2-4 m range.

4.14 Karnataka

Depth to Water Level-Premonsoon 2016

In the state of Karnataka, very shallow water level ranging between 0-2 m bgl has been observed in about only 5% of the wells monitored. In general depth to water level scenario in the state depicted a water level in the range of 2-20 m bgl, as almost 93 % of the wells monitored fall in this range. Depth to water level of 2-5 m bgl is observed in 21 % of the monitored wells, whereas, 45 % wells show water level of 5-10 m bgl. Deeper water level of more than 10 m bgl is observed in almost 28 % wells. The depth to water level in the state ranges upto 89.40 m bgl in Gulbarga District.

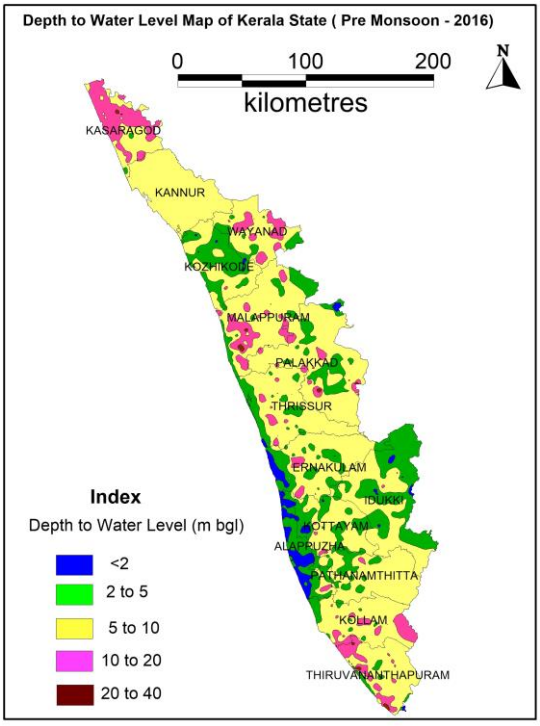


Water Level Fluctuation - Premonsoon 2016 to Premonsoon 2015

Water level data of Premonsoon 2016 was compared to Premonsoon 2015 and the analysis shows that there is rise in water level in about only 21% of the wells and fall in about 72% of the wells. 15% wells have shown a rise in 0-2 m range, 3% of the wells have shown a rise in 2-4 m range and 3% wells show a rise of more than 4 m range. 45% wells have shown a fall in the range of 0 - 2 m, 15% wells have shown decline in the range of 2-4 m range and 13% in the range of more than 4 m.

Fluctuation - Premonsoon 2016 to Premonsoon Decadal mean (2006-15)

The fluctuation of water level during Premonsoon 2016 when compared with the Decadal mean (Premonsoon 2006-2015) indicates that there is predominantly fall in water level in the state. About 69% of analysed wells have shown a decline, mostly in the range of 0-2 m, whereas, only 30% wells have shown a rise in water level. 1% well shows no change in water level.



4.15 Kerala

Depth to Water Level - Premonsoon 2016

In the state of Kerala, very shallow water level ranging between 0-2 m bgl has been observed in about only 7% of the wells monitored. In general depth to water level scenario in the state depicted a water level in the range of 2-10 m bgl, as almost 74 % of the wells monitored fall in this range. Depth to water level of 2-5 m bgl is observed in 28 % of the monitored wells, whereas, 46 % wells show water level of 5-10 m bgl. Deeper water level of more than 10 m bgl is observed in almost 18 % wells. The depth to water level in the state ranges upto 39.31 m bgl in Mallappuram District.

Water Level Fluctuation - Premonsoon 2016 to Premonsoon 2015

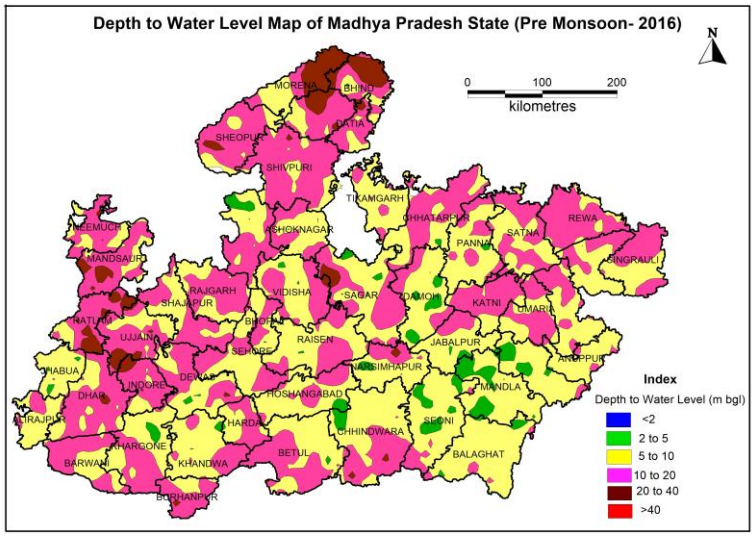
Water level data of Premonsoon 2016 was compared to Premonsoon 2015 and the analysis shows that there is fall in water level in the state. About 30% of the wells show rise in water level and 69% wells show decline. 1% of the well shows no change in water level. 26% wells have shown a rise in 0-2 m range and out of 69 % wells showing fall, 62% shows fall in 0-2 m range. Rise and fall is in the range of 0-2 m range.

Fluctuation - Premonsoon 2016 to Premonsoon Decadal mean (2006-15)

The fluctuation of water level during Premonsoon 2016 when compared with the decadal mean (Premonsoon 2006 -2015) indicates that there is both rise and fall in water level in the state. About 37% of analysed wells have shown a rise in water level, of which 34% of the wells show rise in the range of 0 to 2 m. About 63% wells have shown a fall in water level out of which 56% wells shows fall in the range of 0-2 m. Rise and fall is mainly restricted to 0-2 m only.

4.16 Madhya Pradesh

Depth to Water Level - Premonsoon 2016



The depth to water level during Premonsoon 2016 in Madhya Pradesh varies from 1.10 to 49.57 m bgl in Indore district. In general the depth to water level ranges from 5 m to 20 m bgl in most parts of Madhya Pradesh. Less than 1 % monitoring wells are showing water level in 0-2 m bgl range. About 20 % of monitoring wells are showing water level in 2-5 m bgl range. Depth to water level ranging between 5-10 m bgl was observed in 44% wells and about 29% wells show water level ranging more than 10 m bgl located mostly in pockets in the entire state. Water levels of more than 20 m bgl are observed at 5% wells in northernmost parts of the state in Bundelkhand region.

Water Level Fluctuation - Premonsoon 2016 to Premonsoon 2015

Water level data of Premonsoon 2016 was compared to Premonsoon 2015 and the analysis shows that there is fall in water level in the entire state. About 72% of the wells show fall in water level and rise in about 26% of the wells. 2% well show no change in water level. 19% wells have shown a rise in 0-2 m range. About 51% wells show fall in the range of 0-2 m, 13% in 2-4 m range and 9% in more than 4 m range.

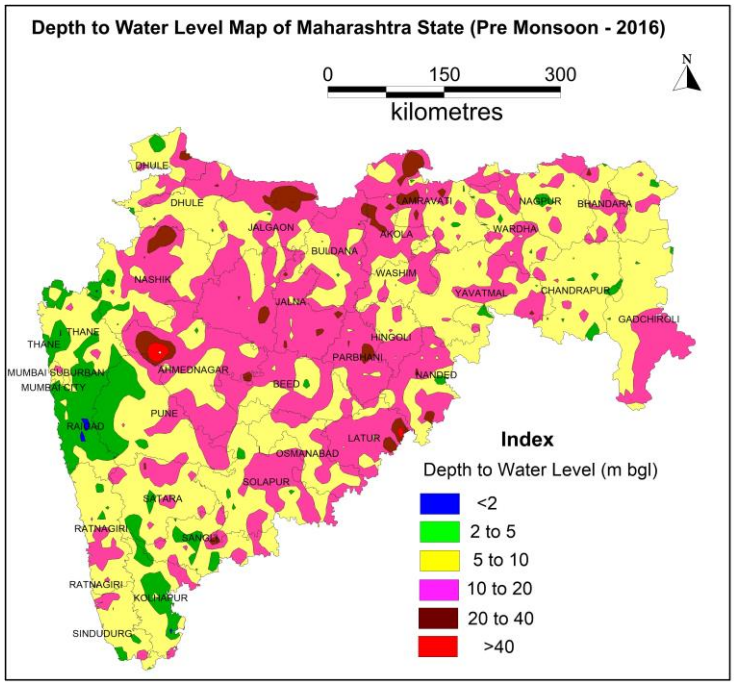
Fluctuation - Premonsoon 2016 to Premonsoon Decadal mean (2006-15)

The fluctuation of water level during Premonsoon 2016 when compared with the Decadal mean (Premonsoon 2006 -2015) indicates that about only 37% of analysed wells have shown a rise in water level, of which 26% of the wells show rise in the range of 0 to 2 m. About 7% wells have shown a rise in water level in the range of 2-4 m and 4% wells have shown a rise in water level in the range of more than 4 m. About 62% wells have shown a decline in water level, out of which 43% falls in the range of 0-2 m. Rise and fall is in the range of 0-2 m.

4.17 Maharashtra

Depth to Water Level - Premonsoon 2016

In the state of Maharashtra, very shallow water level ranging between 0-2 m bgl has been observed in about only 2% of the wells monitored. In general depth to water level scenario in the state depicted a water level in the range of 5-20 m bgl, as almost 80 % of the wells monitored fall in this range. Depth to water level of 2-5 m bgl is observed in 13 % of the monitored wells, whereas, 45% wells show water level of 5-10 m bgl. Deeper water level of more than 10 m bgl is observed in almost 35 % wells and 4% wells show very deep water level of more than 20 m. The depth to water level in the state ranges upto 153 m bgl in Ahmednagar District.



Water Level Fluctuation - Premonsoon 2016 to Premonsoon 2015

Water level data of Premonsoon 2016 was compared to Premonsoon 2015 and the analysis shows that there is rise in water level in about 26% of the wells and fall in about 70% of the wells. 4% wells show no change. 20% wells have shown a rise in the range of 0-2 m, about 5% of the wells have shown rise in the range of 2-4 m and 2% wells show rise of more than 4 m. 70% of the wells have shown fall in

water level, out of which 42% wells show in in 0-2 m range, 17% in 2- 4 m range and 12% in more than 4 m range.

Fluctuation - Premonsoon 2016 to Premonsoon Decadal mean (2006-15)

The fluctuations of water level during Premonsoon 2016 when compared with the Decadal mean (Premonsoon 2005-2014) show that about 29% of analysed wells have shown a rise in water level, out of which, 22% of the wells show rise in the range of 0 to 2 m and 5% wells have shown rise in the range of 2-4 m. About 70% wells have shown a decline in water level, out of which, 41% of the wells fall in the range of 0-2 m. 17% wells show decline in 2-4 m range and 12% wells in more than 4 m range.

4.18 Meghalaya

Depth to Water Level – Premonsoon 2016

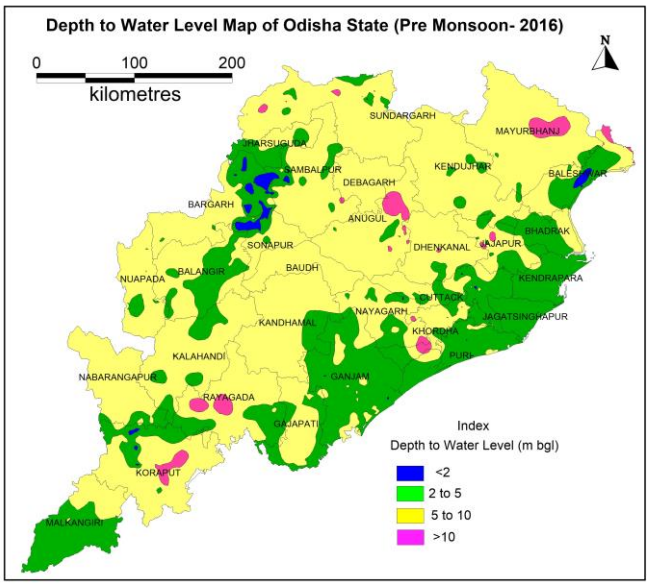
In general depth to water level scenario in the state depicted a water level in the range of 2 to 5 m bgl. About 18% monitoring stations recorded water level within 2 m bgl and another 71% wells recorded water level between 2-5 m bgl. 12 % wells shows water level in 5-10m bgl. Water level varies from 0.71 to 5.50 m bgl.

Water Level Fluctuation - Premonsoon 2016 to Premonsoon 2015

Water level data of Premonsoon 2016 was compared to Premonsoon 2015 and the analysis shows that in general there is both rise and fall in water level in the state. About 46 % of the wells analysed are showing rise in the water level and 54% wells are showing fall in water level. Out of 46% wells showing rise, all the wells lies in the range of 0-2 m. Out of 54% wells showing fall, all wells have shown fall in 0-2 m range.

Fluctuation - Premonsoon 2016 to Premonsoon Decadal mean (2006-15)

The fluctuations of water level during Premonsoon 2016 when compared with the Decadal mean (Premonsoon 2006-2015) shows that about 35% of analysed wells have shown a rise in water level, and 65% wells show fall. Out of 35% of the wells showing rise, 29% wells falls in the range of 0 to 2 m. Another 6% wells show rise 44 in more than 4 m range. 65% wells show fall in 0-2 m range.



4.19 Odisha

Depth to Water Level - Premonsoon 2015

In the state of Odisha, very shallow water level ranging between 0-2 m bgl has been observed in about only 7% of the wells monitored. In general depth to water level

scenario in the state depicted a water level in the range of 2-10 m bgl, as almost 90 % of the wells monitored fall in this range. Depth to water level of 2-5 m bgl is observed in 38 % of the monitored wells, whereas, 51% wells show water level of 5-10 m bgl. Deeper water level of more than 10 m bgl is observed in only 4 % wells. The depth to water level in the state ranges upto 18.80 m bgl in Anugul District.

Water Level Fluctuation - Premonsoon 2016 to Premonsoon 2015

Water level data of Premonsoon 2016 was compared with that of Premonsoon 2015. The analysis shows that there is fall in water level in the entire state. About 71% of the wells shows fall in water level, out of which about 65% wells have shown a fall in 0-2 m range. Only 27% wells show rise in water level, out of which 25 % is in 0-2 m range. 2% well shows no change.

Fluctuation - Premonsoon 2016 to Premonsoon Decadal mean (2006-15)

The fluctuation of water level during Premonsoon 2016 when compared with the Decadal mean (Premonsoon 2006-2015) indicates that there is predominantly fall in water level in the state. About 64% of analysed wells have shown a decline in water level and 36% wells have shown a rise in water level. Out of the wells showing rise, 31% is in the category of 0-2 m and similarly in the decline category 58% wells lies in the 0-2 m range.

4.20 Pondicherry

Depth to Water Level – Premonsoon 2016

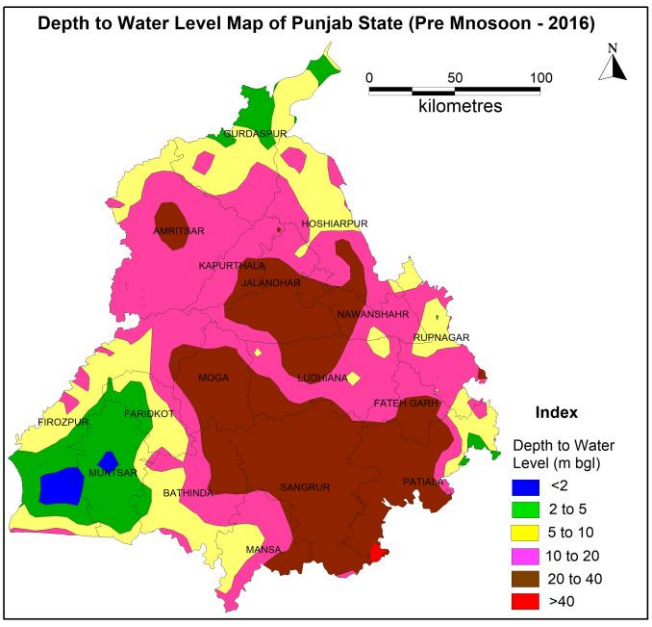
During Premonsoon 2016, a total of 6 wells have been monitored. All the wells show water level upto 5 m bgl.

Water Level Fluctuation – Premonsoon 2016 to Premonsoon 2015

The water level data of Premonsoon 2016 when compared with Premonsoon 2015 indicates that there is rise in water level in 67% of the wells analysed and 33% show decline in water level.

Fluctuation - Premonsoon 2016 to Premonsoon Decadal mean (2006-15)

When compared the decadal mean water level (Premonsoon 2006 to 2015) with Premonsoon 2016, 71% of observation wells are showing rise in water level, all in the range of 0-2 m. 29% show decline in water level and all in 0-2 m range.



4.21 Punjab

Depth to Water Level - Premonsoon 2016

In the state of Punjab, very shallow water level ranging between 0-2 m bgl has

been observed in about only 5% of the wells monitored. In general depth to water level scenario in the state depicted a water level in the range of 5-20 m bgl, as almost more than 50%of the wells monitored fall in this range. Depth to water level of 2-5 m bgl is observed in 15 % of the monitored wells, whereas, 27% wells show water level of 5-10 m bgl. Deeper water level of more than 10 m bgl is observed in almost 30% wells and 24% wells show very deep water level of more than 20 m. The depth to water level in the state ranges upto 39.35 m bgl in Patiala District.

Water Level Fluctuation - Premonsoon 2016 to Premonsoon 2015

The comparison of water level data of Premonsoon 2016 and Premonsoon 2015 shows that there is decline in water level in the state. 71% of the wells show fall in water level, out of which 61% wells show decline of 0-2 range. 28% wells analysed show rise in water level, out of which 21% wells show rise in 0-2 m range. Rise and fall in restricted to 0-2 m range.

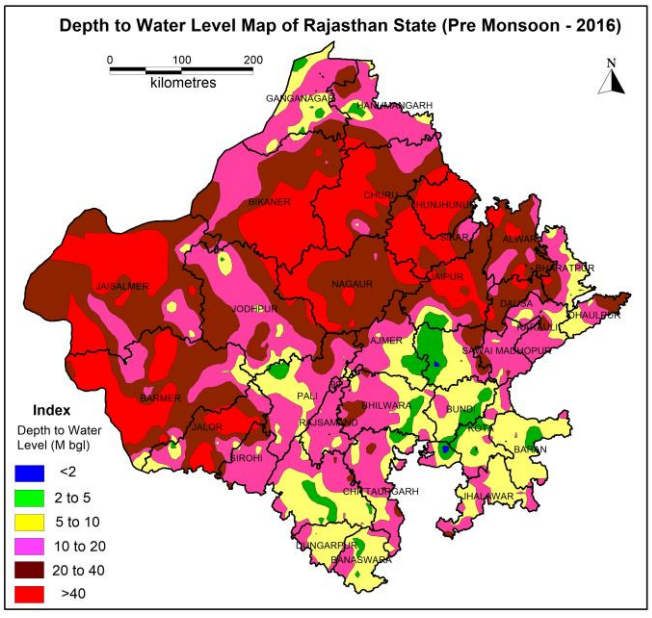
Fluctuation - Premonsoon 2016 to Premonsoon Decadal mean (2006-15)

The fluctuation of water level during Premonsoon 2016 with respect to average water level of past decade (Decadal mean Premonsoon 2006-2015) indicates decline in water level in major parts of the State. About 25% of the wells have shown rise, of which 20% wells show water level rise in the range of 0-2 m. Fall in water level is observed in 75% of the wells. Out of this, 49% of the wells analysed is showing fall in the range of 0-2 m, 17% of the wells showing fall of 2-4 m and 9% falls in more than 4 m range.

4.22 Rajasthan

Depth to Water Level - Premonsoon 2016

In the state of Rajasthan, very shallow water level ranging between 0-2 m bgl has been observed in about only 2% of the wells monitored. In general depth to water level scenario in the state depicted a water level in the range of 5-20 m bgl, as almost more than 50% of the wells monitored fall in this range. Depth to water level of 2-5 m bgl is observed in only 9% of the monitored wells, whereas, 23% wells show water level of 5-10 m bgl. Deeper water level of more than 10 m bgl is observed in almost 30% wells and 18% wells show very deep water level of more than 20 m. More than 40 m water level is also seen in 19% wells analysed. The depth to water level in the state ranges upto 106.32 m bgl in Jaisalmer District.



Water Level Fluctuation - Premonsoon 2016 to Premonsoon 2015

Comparison of water level of Premonsoon 2016 and Premonsoon 2015 in the state indicates that about 27% of the wells analysed have recorded a rise in water level, out of which 19% of analysed wells have recorded a rise in the range of 0 to 2 m, 5% of analysed wells have shown rise in the range of 2 to 4 m and 4% of the wells have shown rise more than 4 m. 72% of the wells have shown fall in water level, out of this, 45% have recorded fall in the range of 0 to 2 m, 16% in 2-4 m range and 11% in more than 4 m range.

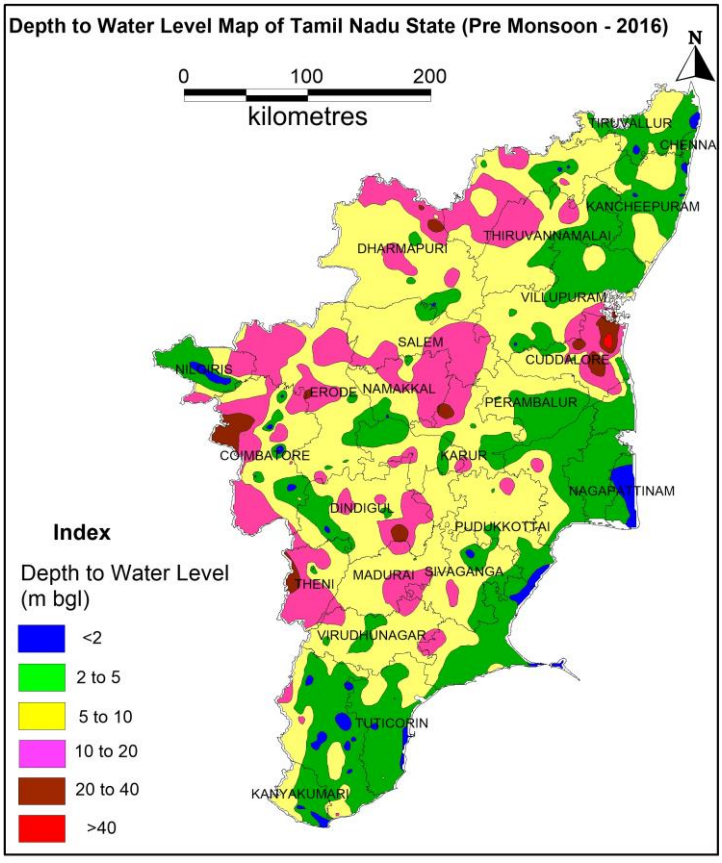
Fluctuation - Premonsoon 2016 to Premonsoon Decadal mean (2006-15)

The fluctuation of water level during Premonsoon 2016 with respect to Decadal mean (Premonsoon 2006 -2015) indicates that there is rise in water level in about 42% of the analysed wells. Out of this, 26% of the wells have shown rise in the range of 0-2 m, 9% in 2 - 4 m range and 6% in more than 4 m range. Another 58 % of the wells have shown a fall in water level. Out of this 28% of the wells have shown fall in the range of 0-2 m while 14% of the wells have shown fall in the range of 2-4 m and 16% of wells analysed have shown fall of more than 4 m.

4.23 Tamil Nadu

Depth to Water Level - Premonsoon 2016

In the state of Tamil Nadu, very shallow water level ranging between 0-2 m bgl has been observed in about 10% of the wells monitored. In general depth to water level scenario in the state depicted a water level in the range of 2-10 m bgl, as almost more than 70% of the wells monitored fall in this range. Depth to water level of 2-5 m bgl is observed in 33% of the monitored wells, whereas, 39% wells show water level of 5-10 m bgl. Deeper water level of more than 10 m bgl is observed in almost 15% wells and only 3% wells show very deep water level of more than 20 m. More than 40 m water level is also seen in less than 1% wells analysed. The depth to water level in the state ranges upto 75.60 m bgl in Cuddalore District.



Water Level Fluctuation - Premonsoon 2016 to Premonsoon 2015

Water level of Premonsoon 2016 when compared to water level of Premonsoon 2015 in the state indicates that there is both rise and fall in water level in the entire state. About 47% of the wells analysed have recorded a rise in water level, out of which 28% of analysed wells have recorded a rise in the range of 0 to 2 m, 12% of analysed wells have shown rise in the range of 2 to 4 m and 8% of the wells have shown rise of more than 4 m. About 52% of the wells have shown fall in water level, out of this 38% of wells have recorded fall in the range of 0 to 2 m range, 9% wells show decline in 2-4 m range and 6% wells in more than 4 m range.

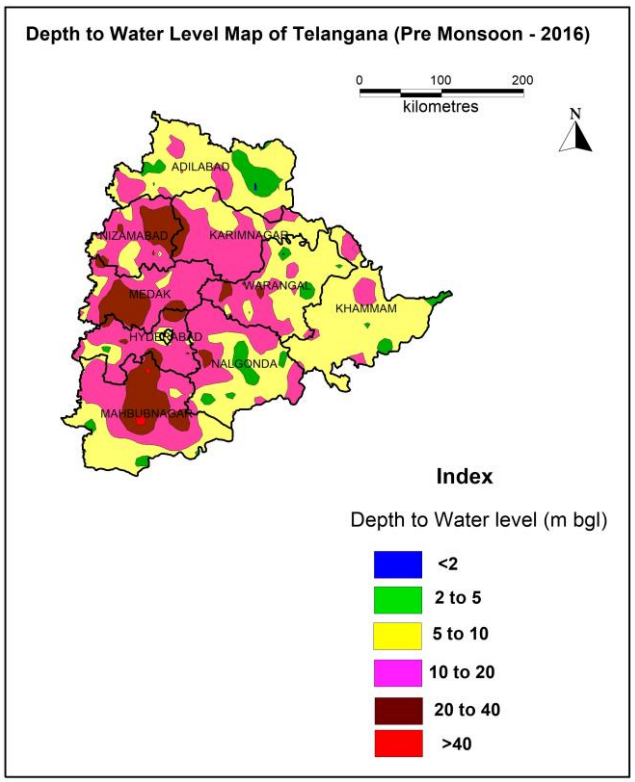
Fluctuation - Premonsoon 2016 to Premonsoon Decadal mean (2006-15)

The water level during Premonsoon 2016 when compared with the Decadal mean (Premonsoon 2006 -2015) indicates that there is in general rise in water level in the state. About 59% of analysed wells have shown rise in water level. Out of this, 41% of the wells have shown rise in the range of 0-2 m, 12% of analysed wells have shown rise in the range of 2 - 4 m and 5% of the wells have shown rise of more than 4 m. About 41% of the wells have shown a decline in water level, out of which 30% of the wells have shown fall in the range of 0-2 m, 8% wells show decline in 2-4 m range and 3% in more than 4 m range.

4.24 Telangana

Depth to Water Level - Premonsoon 2016

In the state of Telangana, very shallow water level ranging between 0-2 m bgl has been observed in about only 1% of the wells monitored. In general depth to water level scenario in the state depicted a water level in the range of 5-20 m bgl, as almost 75% of the wells monitored fall in this range. Depth to water level of 2-5 m bgl is observed in 11% of the monitored wells, whereas, 36% wells show water level of 5-10 m bgl. Deeper water level of more than 10 m bgl is observed in majority of the wells, ie 38% wells and 12% wells show very deep water level of more than 20 m. More than 40 m water level is also seen in less than 2% wells analysed. The depth to water level in the state ranges upto 54.78 m bgl in Warangal District.



Water Level Fluctuation - Premonsoon 2016 to Premonsoon 2015

Water level of Premonsoon 2016 when compared to that of Premonsoon 2015 shows that there is dominantly fall in water level in the state. About 70% of the wells analysed have recorded a fall in water level, out of which 36% of analysed wells have recorded a fall in the range of 0 to 2 m, 19% of analysed wells have shown fall in the range of 2 to 4 m and 15% of the wells have shown fall of more than 4 m. About 19% of the wells have shown rise in water level, out of this 15% of wells have recorded rise in the range of 0 to 2 m. 11% wells show no change in water level.

Fluctuation - Premonsoon 2016 to Premonsoon Decadal mean (2006-15)

The water level during Premonsoon 2016 when compared with the Decadal mean (Premonsoon 2006 -2015) indicates that there is in general fall in water level in the entire state. About 82% of analysed wells have shown decline in water level. Out of this, 36% of the wells have shown decline in the range of 0-2 m, 22% of analysed wells have shown fall in the range of 2 - 4 m and 24% of the wells have shown fall of more than 4 m. Remaining 18% of the wells have shown a rise in water level, out of which 14% of the wells have shown rise in the range of 0-2 m.

4.25 Tripura

Depth to Water Level – Premonsoon 2016

In general depth to water level scenario in the state depicted a water level in the range of 0 to 5 m bgl. 32% wells show water level in less than 2 m bgl range, 43 % wells show water level in 2-5 m bgl and 25% wells show water level of 5-10 m bgl. Maximum water level of 7.18 m bgl is seen at North Tripura.

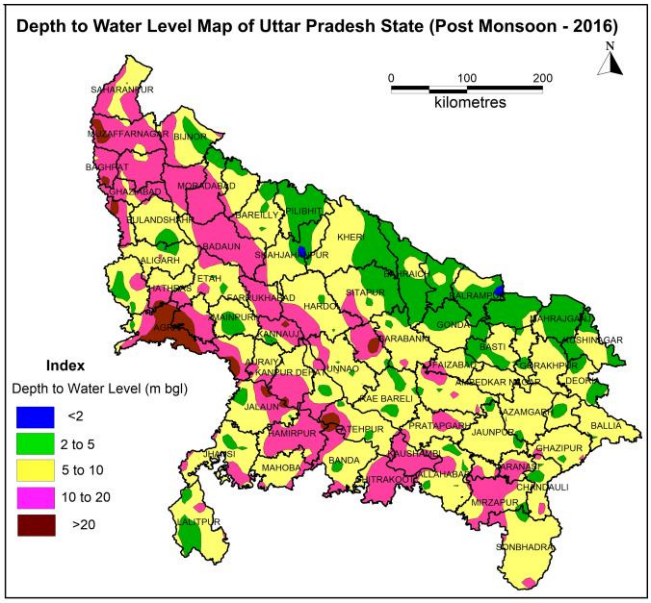
Water Level Fluctuation - Premonsoon 2016 to Premonsoon 2015

Comparison of water level of Premonsoon 2016 with Premonsoon 2015 shows that there is rise in water level in the state. 63% of the wells analysed show rise and another 37 % show fall in water level and all in the range of 0-2 m.

Fluctuation - Premonsoon 2016 to Premonsoon Decadal mean (2006-15)

The water level data of Premonsoon 2016 has been compared with decadal mean (Premonsoon 2006-2015) and it is observed that 75% show a rise in water level whereas 25% show a fall in water level. Both rise and fall is in the range of 0-2 m.

4.26 Uttar Pradesh



Depth to Water Level - Premonsoon - 2016

In the state of Uttar Pradesh, very shallow water level ranging between 0-2 m bgl has been observed in about only 1% of the wells monitored. In general depth to water level scenario in the state depicted a water level in the range of 2-10 m bgl, as almost more than 70% of the wells monitored fall in this range. Depth to water level of 2-5 m bgl is observed in 25% of the monitored wells, whereas, 47% wells show water level of 5-10 m bgl. Deeper water level of more than 10 m bgl is observed in majority of the wells, ie 23% wells and 3% wells show very deep water level of more than 20 m. The depth to water level in the state ranges upto 37.50 m bgl in Lucknow District.

Water Level Fluctuation - Premonsoon 2016 to Premonsoon 2015

Water levels of Premonsoon 2016 when compared to water level of Premonsoon 2015 in the state indicates that the entire state shows a decline in water level. About 92% wells show decline in water level, out of which 74% wells have recorded a fall in the range of 0 to 2 m, 14% of analysed wells have shown fall in the range of 2 to 4 m and 4% wells have shown fall of more than 4 m. About 8% of the wells have shown rise in water level, and all in the range of 0-2 m.

Fluctuation - Premonsoon 2016 to Premonsoon Decadal mean (2006-15)

The fluctuation of water level during Premonsoon 2016 when compared with the Decadal mean (Premonsoon 2006-2015), indicates that there is in general fall in water level in the state. About 85% of analysed wells have shown fall in water level. Out of this 69% of the wells have shown fall in the range of 0-2 m, 13% of analysed wells have shown fall in the range of 2 - 4 m and 3% of the wells have shown fall more than 4 m. About 15% of the wells have shown a rise in water level and mostly in 0-2 m range.

4.27 Uttarakhand

Depth to Water Level - Premonsoon 2016

Uttarakhand state is mainly covered by hilly/ mountainous areas. About 85% of the area is hilly and has no appreciable ground water potential whereas about 15% of the state is plain where ground water is developed. Depth to water level in the range of 0-2 m is observed in 1 % wells, 2-5 m bgl in 25% of the wells analysed, 47% of the wells show water level in the range of 5-10 m bgl and 23% in the range of 10-20 m bgl. Deeper water level of more than 20 m bgl is seen in 3% wells. In Nainital district, maximum water level of 31.75 m bgl is recorded.

Water Level Fluctuation - Premonsoon 2016 to Premonsoon 2015

The comparison of Premonsoon 2016 water level with Premonsoon 2015 reveals that rise in water level is observed in 62% of the wells analysed and decline at 38% wells. The rise in water level in the range of 0-2 m has been observed in 47% wells. The fall in water level in the range of 0-2 m has been observed in 33 % of wells. Rise and fall is restricted to 0-2 m range.

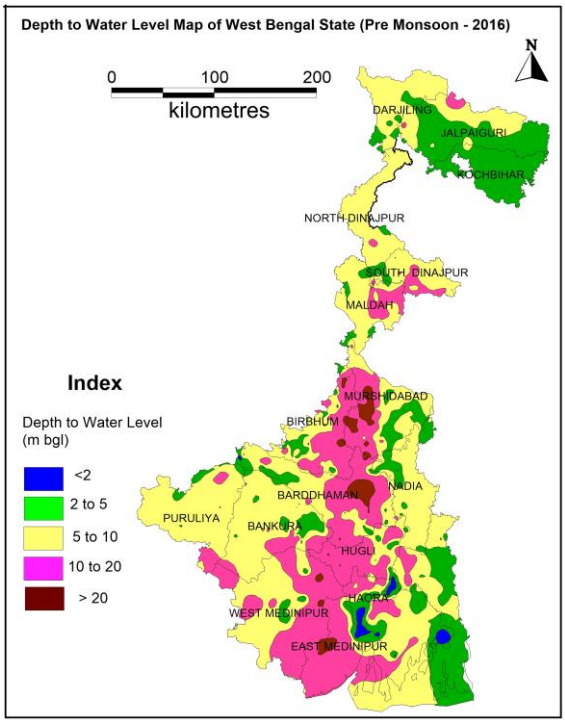
Fluctuation - Premonsoon 2016 to Premonsoon Decadal mean (2006-15)

The comparison of Premonsoon 2016 water level with decadal mean of (Premonsoon 2006 -2015) reveals that about only 48% of the analysed wells have shown rise in water level. Out of this, rise in water level in the range of 0-2 m has been observed at 41% of wells. Majority of the wells, ie, 52% have shown decline in water level and out of these 43% wells fall in the range of 0-2 m and 5% in 2-4 m range.

4.28 West Bengal

Depth to Water Level – Premonsoon 2016

In the state of West Bengal, very shallow water level ranging between 0-2 m bgl has been observed in about only 4% of the wells monitored. In general depth to water level scenario in the state depicted a water level in the range of 5-20 m bgl, as almost more than 65% of the wells monitored fall in this range. Depth to water level of 2-5 m bgl is observed in 24% of the monitored wells, whereas, 40% wells show water level of 5-10 m bgl. Deeper water level of more than 10 m bgl is observed in 27% wells and 5% wells show very deep water level of more than 20 m. The depth to water level in the state ranges upto 29.17 m bgl in Murshidabad District.



Water Level Fluctuation–Premonsoon 2016 to Premonsoon 2015

Water level data of Premonsoon 2016 was compared to Premonsoon 2015 and the analysis shows that there is fall in water level in majority of the state. About 68% of the wells show decline in water level and 32% wells show rise in water level. Out of 68% fall, 49 % wells have shown a decline in the range of 0-2 m, 13% of the wells have shown decline in the range of 2-4 m whereas 7% wells show fall in the range of more than 4 m. In the rise category, 27 % wells analysed show rise in 0-2 m range.

Fluctuation - Premonsoon 2016 to Premonsoon Decadal mean (2006-15)

When compared the decadal mean water level (Premonsoon 2006 to 2015) with water level of Premonsoon 2016, there is predominantly fall in water level in the state. About 66% of the analysed wells have shown decline in water level. Out of this, decline in the range of 0-2 m has been observed at 43% of wells. About 34% of the analysed wells have shown rise in water level, out of which 29% shows rise in the range of 0-2 m. This indicates rise and fall in water level is restricted to 0-2m range.

Annexure-I

State-wise Depth to water Level and Distribution of Percentage of Wells for the Period of Premonsoon 2016

State-wise Depth to water Level and Distribution of Percentage of Wells for the Period of Premonsoon, 2016

S. No.	Name of State	No. of wells Analysed	Depth to Water Level (mbgl)		Number & Percentage of Wells Showing Depth to Water Level (mbgl) in the Range of											
					0-2		2-5		5-10		10-20		20-40		> 40	
			Min	Max	No	%	No	%	No	%	No	%	No	%	No	%
1	Andaman & Nicobar Island	93	-0.25	11.8	34	37	54	58	4	4.3	1	1.1	0	0	0	0
2	Andhra Pradesh	775	0.00	49.30	82	10.58	333	42.97	263	33.9	91	11.74	5	0.65	1	0.13
3	Arunachal Pradesh	15	1.02	11.22	2	13.33	8	53.33	3	20.00	2	13.33	0	0.00	0	0.00
4	Assam	187	0.22	19.67	26	13.90	110	58.82	45	24.06	6	3.21	0	0.00	0	0.00
5	Bihar	623	1.13	15.80	8	1.28	233	37.40	353	56.66	29	4.65	0	0.00	0	0.00
6	Chandigarh	12	2.72	28.75	0	0.00	2	16.67	4	33.33	3	25.00	3	25.00	0	0.00
7	Chhattisgarh	623	1.51	54.80	8	1.28	95	15.25	338	54.25	161	25.84	19	3.05	2	0.32
8	Dadra & Nagar Haveli	16	3.36	17.00	0	0.00	3	18.75	7	43.75	6	37.50	0	0.00	0	0.00
9	Daman & Diu	12	3.50	10.41	0	0.00	1	8.33	10	83.33	1	8.33	0	0.00	0	0.00
10	Delhi	116	1.84	58.89	2	1.72	24	20.69	30	25.86	31	26.72	19	16.38	10	8.62
11	Goa	71	2.08	18.84	0	0.00	29	40.85	34	47.89	8	11.27	0	0.00	0	0.00
12	Gujarat	822	0.05	58.24	21	2.55	123	14.96	277	33.70	308	37.47	84	10.22	9	1.09
13	Haryana	320	0.51	76.04	14	4.38	66	20.63	82	25.63	94	29.38	55	17.19	9	2.81
14	Himachal Pradesh	96	0.36	28.23	5	5.21	38	39.58	26	27.08	19	19.79	8	8.33	0	0.00

15	**Jammu & Kashmir**	225	0.49	35.47	29	12.89	118	52.44	53	23.56	15	6.67	10	4.44	0	0.00
16	**Jharkhand**	230	2.05	19.25	0	0.00	26	11.30	170	73.91	34	14.78	0	0.00	0	0.00
17	**Karnataka**	1409	0.01	89.40	72	5.11	293	20.79	627	44.50	387	27.47	27	1.92	3	0.21
18	**Kerala**	1308	0.45	39.31	93	7.11	365	27.91	605	46.25	228	17.43	17	1.30	0	0.00
19	**Madhya Pradesh**	1360	1.10	49.57	6	0.44	143	10.51	617	45.37	508	37.35	74	5.44	12	0.88
20	**Maharashtra**	1581	0.51	153.00	31	1.96	209	13.22	712	45.03	559	35.36	64	4.05	6	0.38
21	**Meghalaya**	17	0.71	5.50	3	17.65	12	70.59	2	11.76	0	0.00	0	0.00	0	0.00
22	**Nagaland**	17	2.82	16.17	0	0.00	6	35.29	9	52.94	2	11.76	0	0.00	0	0.00
23	**Orissa**	1114	0.02	18.80	82	7.36	425	38.15	565	50.72	42	3.77	0	0.00	0	0.00
24	**Pondicherry**	6	1.83	3.37	1	16.67	5	83.33	0	0.00	0	0.00	0	0.00	0	0.00
25	**Punjab**	259	0.58	39.35	12	4.63	39	15.06	69	26.64	78	30.12	61	23.55	0	0.00
26	**Rajasthan**	859	0.35	106.32	13	1.51	75	8.73	196	22.82	254	29.57	157	18.28	164	19.09
27	**Tamil Nadu**	591	0.00	75.60	56	9.48	193	32.66	232	39.26	90	15.23	17	2.88	3	0.51
28	**Telangana**	399	1.09	54.78	5	1.25	42	10.53	144	36.09	152	38.10	48	12.03	8	2.01
29	**Tripura**	28	1.30	7.18	9	32.14	12	42.86	7	25.00	0	0.00	0	0.00	0	0.00
30	**Uttar Pradesh**	635	0.00	37.50	8	1.26	160	25.20	301	47.40	146	22.99	20	3.15	0	0.00
31	**Uttarakhand**	44	1.07	31.75	1	2.27	17	38.64	12	27.27	13	29.55	1	2.27	0	0.00

West Bengal	907	0.26	29.17	34	3.75	217	23.93	362	39.91	247	27.23	47	5.18	0	0.00
Total	**14770**			**657**	**4.45**	**3476**	**23.53**	**6159**	**41.70**	**3515**	**23.80**	**736**	**4.98**	**227**	**1.5**

Annexure-II

State-wise Annual Fluctuation & Frequency Distribution of Different Ranges from Premonsoon 2016 to Premonsoon 2015

S. No	Name of State	No. of wells Analysed	Range in m				Rise						Fall						Rise		Fall	
			Rise		Fall		0-2 m		2-4 m		>4 m		0-2 m		2-4 m		>4 m					
			Min	Max	Min	Max	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
1	Andaman & Nicobar	74	0.01	2.98	0.01	3.3	26	35.1	3	4.1	0	0.0	38	51.4	7	9.5	0	0.0	29	39	45	61
2	Andhra Pradesh	538	0.01	13.25	0.03	17.2	175	32.5	30	5.6	35	6.5	197	36.6	44	8.2	25	4.6	240	45	266	49
3	Arunachal Pradesh	13	0.05	2.67	0.13	0.9	3	23.1	3	23.1	0	0.0	4	30.8	0	0.0	0	0.0	6	46	4	31
4	Assam	160	0.04	10.28	0.01	17.1	67	41.9	5	3.1	4	2.5	70	43.8	12	7.5	1	0.6	76	48	83	52
5	Bihar	528	0.01	9.55	0.01	6.4	140	26.5	17	3.2	4	0.8	294	55.7	51	9.7	13	2.5	161	30	358	68
6	Chandigarh	10	0.22	3.32	0.51	2.3	5	50.0	1	10.0	0	0.0	2	20.0	2	20.0	0	0.0	6	60	4	40
7	Chhattisgarh	522	0.04	11.65	0.04	14.4	68	13.0	23	4.4	15	2.9	259	49.6	82	15.7	72	13.8	106	20	413	79
8	Dadra & Nagar Haveli	12	0.60	4.80	0.04	3.3	3	25.0	1	8.3	1	8.3	6	50.0	1	8.3	0	0.0	5	42	7	58
9	Daman & Diu	9	0.05	0.14	0.04	2.0	2	22.2	0	0.0	0	0.0	6	66.7	0	0.0	0	0.0	2	22	6	67

S. No	Name of State	No. of wells Analysed	Range in m				Rise						Fall						Rise		Fall	
			Rise		Fall		0-2 m		2-4 m		>4 m		0-2 m		2-4 m		>4 m					
			Min	Max	Min	Max	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
10	**Delhi**	114	0.01	4.90	0.01	10.3	27	23.7	4	3.5	1	0.9	73	64.0	8	7.0	1	0.9	32	28	82	72
11	**Goa**	35	0.02	1.18	0.01	4.2	15	42.9	0	0.0	0	0.0	18	51.4	1	2.9	1	2.9	15	43	20	57
12	**Gujarat**	701	0.01	13.48	0.01	17.4	171	24.4	44	6.3	29	4.1	232	33.1	77	11.0	78	11.1	244	35	387	55
13	**Haryana**	269	0.01	11.64	0.02	7.3	76	28.3	13	4.8	2	0.7	147	54.6	26	9.7	5	1.9	91	34	178	66
14	**Himachal Pradesh**	82	0.04	7.69	0.01	6.5	15	18.3	0	0.0	2	2.4	51	62.2	12	14.6	2	2.4	17	21	65	79
15	**Jammu & Kashmir**	214	0.04	3.23	0.02	7.2	29	13.6	4	1.9	0	0.0	121	56.5	46	21.5	14	6.5	33	15	181	85
16	**Jharkhand**	114	0.02	4.40	0.04	5.5	25	21.9	6	5.3	2	1.8	67	58.8	10	8.8	3	2.6	33	29	80	70
17	**Karnataka**	1338	0.01	12.63	0.01	16.2	199	14.9	45	3.4	34	2.5	595	44.5	203	15.2	172	12.9	278	21	970	72
18	**Kerala**	1192	0.01	10.25	0.01	16.6	310	26.0	31	2.6	13	1.1	735	61.7	57	4.8	30	2.5	354	30	822	69
19	**Madhya Pradesh**	1328	0.01	16.45	0.01	18.7	252	19.0	62	4.7	29	2.2	671	50.5	172	13.0	115	8.7	343	26	958	72
20	**Maharashtra**	1427	0.01	16.30	0.01	16.6	279	19.6	68	4.8	29	2.0	596	41.8	235	16.5	167	11.7	376	26	998	70
21	**Meghalaya**	13	0.06	1.48	0.73	0.9	6	46.2	0	0.0	0	0.0	7	53.8	0	0.0	0	0.0	6	46	7	54
22	**Odisha**	1046	0.01	5.4	0.01	9.6	265	25.3	19	1.8	1	0.1	681	65.1	46	4.4	12	1.1	285	27	739	71

S. No	Name of State	No. of wells Analysed	Range in m				Rise						Fall						Rise		Fall	
			Rise		Fall		0-2 m		2-4 m		>4 m		0-2 m		2-4 m		>4 m					
			Min	Max	Min	Max	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
23	**Pondicherry**	3	0.11	2.57	0.90	0.9	1	33.3	1	33.3	0	0.0	1	33.3	0	0.0	0	0.0	2	67	1	33
24	**Punjab**	212	0.03	12.86	0.01	8.9	44	20.8	12	5.7	4	1.9	128	60.4	15	7.1	7	3.3	60	28	150	71
25	**Rajasthan**	744	0.01	16.01	0.01	17.1	141	19.0	36	4.8	26	3.5	337	45.3	115	15.5	81	10.9	203	27	533	72
26	**Tamil Nadu**	490	0.01	14.45	0.01	12.8	137	28.0	58	11.8	37	7.6	186	38.0	42	8.6	29	5.9	232	47	257	52
27	**Telangana**	366	0.02	16.28	0.01	13.0	56	15.3	7	1.9	8	2.2	133	36.3	68	18.6	55	15.0	71	19	256	70
28	**Tripura**	27	0.15	1.68	0.01	1.0	17	63.0	0	0.0	0	0.0	10	37.0	0	0.0	0	0.0	17	63	10	37
	Uttar Pradesh	530	0.03	7.28	0.01	8.9	42	7.9	0	0.0	1	0.2	390	73.6	75	14.2	21	4.0	43	8	486	92
29	**Uttaranchal**	34	0.06	9.07	0.15	3.2	16	47.1	4	11.8	1	2.9	11	32.4	2	5.9	0	0.0	21	62	13	38
30	**West Bengal**	748	0.02	17.07	0.01	12.5	201	26.9	23	3.1	13	1.7	364	48.7	95	12.7	49	6.6	237	32	508	68
	Total	**12893**					**2813**	**22**	**520**	**4.0**	**291**	**2.3**	**6430**	**49.9**	**1504**	**11.7**	**953**	**7.4**	**3624**	**28**	**8887**	**69**

Annexure-III

State-wise Fluctuation & Frequency Distribution of Different Ranges from Premonsoon 2016 to Decadal Mean [Premonsoon(2006 to 2015)]

S. No.	Name of State	No. of wells Analysed	Range in m				Rise						Fall						Total			
			Rise		Fall		0-2 m		2-4 m		>4 m		0-2 m		2-4 m		>4 m		Rise		Fall	
			Min	Max	Min	Max	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
1	Andhra Pradesh	547	0.01	12.45	0.01	13.89	181	33.1	29	5.3	26	4.8	214	39.1	59	10.8	35	6.4	236	43	308	56
2	Arunachal Pradesh	14	0.04	12.9	0.01	1.2	9	64.3	0	0.0	1	7.1	4	28.6	0	0.0	0	0.0	10	71	4	29
3	Assam	182	0.02	5.82	0.01	7.34	72	39.6	10	5.5	2	1.1	85	46.7	9	4.9	4	2.2	84	46	98	54
4	Bihar	551	0.01	5.19	0	5.51	166	30.1	10	1.8	4	0.7	313	56.8	48	8.7	8	1.5	180	33	369	67
5	Chandigarh	11	0.21	3.28	0.07	3.17	3	27.3	1	9.1	0	0.0	6	54.5	1	9.1	0	0.0	4	36	7	64
6	Chhattisgarh	616	0.02	18.09	0.01	14.23	111	18.0	34	5.5	20	3.2	313	50.8	98	15.9	40	6.5	165	27	451	73
7	Dadra & Nagar Haveli	12	0.17	3.92	0.13	5.85	4	33.3	2	16.7	0	0.0	3	25.0	2	16.7	1	8.3	6	50	6	50
8	Daman & Diu	10	0.08	0.76	0.17	3.53	2	20.0	0	0.0	0	0.0	4	40.0	4	40.0	0	0.0	2	20	8	80
9	Delhi	115	0.06	5.56	0.01	8.3	19	16.5	4	3.5	3	2.6	52	45.2	19	16.5	18	15.7	26	23	89	77

10	**Goa**	70	0.04	2.99	0.01	2.42	36	51.4	5	7.1	0	0.0	28	40.0	1	1.4	0	0.0	41	59	29	41
11	**Gujarat**	738	0.01	15.32	0.01	17.35	171	23.2	63	8.5	20	2.7	284	38.5	99	13.4	92	12.5	254	34	475	64
12	**Haryana**	302	0.01	8.27	0.01	17.45	97	32.1	10	3.3	4	1.3	117	38.7	44	14.6	30	9.9	111	37	191	63
13	**Himachal Pradesh**	95	0.04	9.97	0.04	9.61	30	31.6	3	3.2	3	3.2	47	49.5	9	9.5	3	3.2	36	38	59	62
14	**Jammu & Kashmir**	225	0.02	7.02	0.02	6.81	78	34.7	2	0.9	3	1.3	122	54.2	16	7.1	4	1.8	83	37	142	63
15	**Jharkhand**	212	0.01	10.47	0.02	6.2	69	32.5	12	5.7	5	2.4	109	51.4	14	6.6	3	1.4	86	41	126	59
16	**Karnataka**	1380	0.01	13.53	0	18.88	319	23.1	56	4.1	40	2.9	596	43.2	221	16.0	132	9.6	415	30	949	69
17	**Kerala**	1240	0.01	16.28	0	12.93	414	33.4	27	2.2	13	1.0	699	56.4	60	4.8	20	1.6	454	37	779	63
18	**Madhya Pradesh**	1343	0.03	1281	0.01	15.97	345	25.7	100	7.4	57	4.2	581	43.3	156	11.6	101	7.5	502	37	838	62
19	**Maharashtra**	1487	0.01	17.28	0	16.59	333	22.4	80	5.4	24	1.6	605	40.7	259	17.4	177	11.9	437	29	1041	70
20	**Meghalaya**	17	0.18	4.36	0.03	1.5	5	29.4	0	0.0	1	5.9	11	64.7	0	0.0	0	0.0	6	35	11	65
21	**Odhisha**	1103	0.01	5.38	0.01	9.06	345	31.3	45	4.1	5	0.5	636	57.7	61	5.5	8	0.7	395	36	705	64
22	**Pondicherry**	6	0.14	1.49	0.67	0.67	5	83.3	0	0.0	0	0.0	1	16.7	0	0.0	0	0.0	5	83	1	17
23	**Punjab**	238	0.02	10.99	0.01	8.02	48	20.2	8	3.4	3	1.3	116	48.7	41	17.2	22	9.2	59	25	179	75
24	**Rajasthan**	829	0.02	15.99	0.02	18.33	219	26.4	74	8.9	53	6.4	230	27.7	117	14.1	134	16.2	346	42	481	58
25	**Tamil Nadu**	587	0.01	9.83	0	11.75	243	41.4	71	12.1	31	5.3	178	30.3	45	7.7	19	3.2	345	59	242	41

26	**Telangana**	377	0.02	12.27	0.01	18.83	51	13.5	7	1.9	8	2.1	136	36.1	81	21.5	91	24.1	66	18	308	82
27	**Tripura**	28	0.02	3.25	0.07	1.23	19	67.9	2	7.1	0	0.0	7	25.0	0	0.0	0	0.0	21	75	7	25
28	**Uttar Pradesh**	629	0.01	8.11	0.01	13.5	84	13.4	7	1.1	4	0.6	432	68.7	83	13.2	19	3.0	95	15	534	85
29	**Uttarakhand**	44	0.12	7.09	0.12	5.9	18	40.9	2	4.5	1	2.3	19	43.2	2	4.5	2	4.5	21	48	23	52
30	**West Bengal**	899	0.01	10.21	0.01	15.39	263	29.3	32	3.6	15	1.7	390	43.4	141	15.7	58	6.5	310	34	589	66
Total		**13907**					**3759**	**27.0**	**696**	**5.0**	**346**	**2.5**	**6338**	**45.6**	**1690**	**12.2**	**1021**	**7.3**	**4801**	**35**	**9049**	**65**

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